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THE AMERICAN
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VOL. 101 FEBRUARY, 1929 NO. 2

EDITORIAL

THE RENAISSANCE OF BOTANICAL MEDICINE

NATURE HAS NO MONOPOLY on cycles—for man too bends the trail of his performances into a circumferential boundary. A practice which today he endorses with vigor and enthusiasm—tomorrow he discards for one which he considers superior—and in another day returns again to his primal performance. There is this curving style to every human effort—in every field of human endeavor, and knowing this to be so—a philosopher does not have to be a Presbyterian to know that predestination is only a matter of geometry and Euclidian precision.

As a pool of clear water heaves in colicy cycles when a stone is cast into its middle—so do the silent deep waters of time agonize eccentrically when a civilization is cast upon their surface.

Every age has had its spasmodic rippling—its procession of circles extending outwardly—each recurring circle larger, yet weaker, than the preceding effort—until the force is at last completely spent—and time again is still and silent. And the circles of the New Age are superimposed exactly where the swirling circles of the Old Age created their quick commotion—and so we might go on in merry metaphor except that some one has compressed the sense of all these long-winded paragraphs into that well-known verbal triptych,

"History repeats itself."

In no field of human practice is this so evident as in the field of medicine. The therapeutic cemetery is full of headstones, replete with erstwhile empty graves, and rich in thrice-interred corpses. Nothing that is buried in this graveyard is safely stowed away, for

there is no telling when a night-prowling faddist comes along to steal a carcass or resurrect a corpse.

Read the towering memorials and recollect their heyday. There is the tall monument sacred to the memory of Friedman's turtle serum—and an obelisk to Koch's tuberculin.

And there are stones of less significance to a myriad dead chemicals, dead processes, dead botanicals, and dead zoologicals. Read them as you go—sassafras, smilax, snakeroot and salicin, blood-letting, cupping, leeching and baths—spirit of blood and essence of bone—magistery of mummy—magma menagerie and syrup of zoo.

Truly this *is* a graveyard—but a queer one withal. For there is no telling, for instance, when blood-letting may again be the fashion. Galen, in spite of his Galenical leanings, was quite fond of the practice. Hundreds of years after Galen's time, his disciples, with a brand of brain poorer than their master's, killed George Washington with their *cure*.

For a time the Hippocratic concept of "contraria contrariis curantur"—was quite the thing in medicine—then came Hahnemann with his borrowed, "similes similibus curantur" and that became quite the fashion.

And the trail of medical history today runs true with its typical eccentric erratic course.

Serums, endocrines, vaccines, surgical tricks—ectomy this, otomy that—transfusions, infusions, delusions, adjustments, psychopaths, allopaths, neuropaths, homeopaths—the regular paths and a few detours.

The pet of today is the pest of tomorrow, and the dregs of yesterday are the drugs of today.

Indications of the times seem to point to a renaissance of botanical medicine. Somewhere in the Scriptures it is mentioned that the green things that grow shall be a healing balm to ease humanity's aches and pains. And too long have these been neglected. So truly as the Peruvian bark has furnished the specific to dread malaria—and the white poppy of India its soporific juice—equally true is it that there are a myriad useful plant antidotes to pain waiting for proper appraisal.

The temporary and spectacular successes of surgery—the silly zoological fads—the overdone bacterial medicaments—all have turned our eyes away from medicinal plant possibilities.

In the research department of a large eastern college are several workers seeking the light with respect to eclectic plant principles.

Bryonia, echinacea, lobelia, senega, phytolacca, rhubarb, squill—and drugs of similar nature are receiving their best attentions and it is reported that much progress is being made with the scientific evaluation of these drugs, long since discarded by *fashionable* physicians.

Therapeutic nihilists have had their day and polypharmacy, reduced to a sensible basis, may again become the custom.

The revival of ephedrin—the chaulmoogra esters—the use of wormseed and goldenseal once again point with certainty to more widespread use of nature's chlorophyllic children, in the business of healing the sores of humanity. Though unable to give the source of this quotation, it is recalled as having been culled from the address of a prominent medical man as delivered last year to a State Medical Convention:

"I contend that there is just as much reason to believe in the efficacy of drugs, properly and discriminately administered, as in the administration of vaccine against smallpox, toxin-antitoxin against diphtheria, or the knife in surgery. Indeed drugs have stood the test of time far longer that has the scalpel, toxin-antitoxin against diphtheria, or the knife, toxin-antitoxin or vaccine, though they have passed the experimental stage and we would crown them all.

"No drugs should be used indiscriminately, but with judgment and skill born of personal knowledge of the study of drugs. Used thus we will find in them therapeutic virtues that are among the greatest boons vouchsafed to man."

It seems that Galen, the patron saint of botanical medicine, will rule again and the chemical Paracelsus sleep his sleep, until he is wakened up once more by the returning Galen.

IVOR GRIFFITH.

ORIGINAL ARTICLES

PHARMACY IN EUROPE AND THE UNITED STATES

By Joseph W. England, Ph. M.

Chairman of Board of Trustees, Philadelphia College of Pharmacy and Science

DURING A RECENT TRIP abroad I studied the conditions of the practice of pharmacy and of pharmaceutical education in a number of foreign countries, and submit the following:

Pharmacy in Norway and Sweden

The drug stores of Norway, as of Sweden, are professional stores of the finest type and are conducted in a very ethical manner. They are beautiful in appearance. The store is called an apoteke or apotheke. The pharmacist is called an apoteker or apotheker.

Drugs can be sold only by the apoteker and the number of stores is legally regulated by the quota system. When a pharmacy is made vacant because of the death of the proprietor, or when a new pharmacy is to be established, this is made public and applications are received for the post. The appointment of the apoteker is then made by the government, in the same way as other public officials, with due regard to the principles of seniority and possible scientific work.

There are only thirty-four apotekes in Oslo, or about one store to 8300 of population, a very small proportion. There are no chain or commercial drug stores in Oslo, although there are a few general stores selling related package goods, perfumery, etc.

The pharmacies of Oslo are open from 8 or 9 A. M. to 7 or 8 P. M., practically a twelve-hour day. They are arranged into three groups, each of which is open for certain months each year on Sundays, holidays, and for night calls, after 8 P. M., and all can be reached by the telephone; the rest are kept closed. Many of them have qualified women as assistants. These are very bright and capable and dress in white costumes. I asked one woman apoteker if I could see her prescriptions and she said "prescriptions?—I do not know." But when I wrote the initial cabalistic Rx of the prescription, she said "Ah! the recipe—I know," and produced her prescrip-

tion file. Everything about the stores is wonderfully clean and tidy. The apoteker usually does no analytical, chemical and microscopical laboratory work as in other cities of Europe; this is done by outside specialists.

There is only one school of pharmacy in Norway and this is a department of the University of Oslo.

To become an apoteker, the Norwegian disciple of pharmacy is *now* required to have, first, three years experience with an apoteker, then instruction in pharmacy at the University of Oslo for three or four months (short term), then one year further experience with an apoteker; then two years more study at the University. (If he be especially capable, he may accomplish the work in one and a half years.) In other words, a six years course of instruction is required—four years with an apoteker (where work is of the highest professional type), and about two years at the University of Oslo. Many apotekers continue to serve as assistants in apotekes for years.

As soon, however, as the new and modern Pharmaceutical Institute of the University of Oslo is finished (probably in two years time), an entirely new method of instruction will be given consisting of the following:

The studies will be divided into three sections.

(a) 1st Section: Three semesters of university studies consisting of the natural sciences—chemistry, physics and botany. Finally, there will be, also, a short course in practical pharmacy.

(b) 2nd Section: Service in pharmacy for three semesters.

(c) 3rd Section: Consisting of specifically pharmaceutical studies: pharmaceutical chemistry, pharmaceutical technique and pharmacognosy. In addition there will be bacteriology, some hygiene and commerce, courses in chemistry of foods.

The Norwegian Pharmacopœia is, of course, the official standard. It is revised from time to time by a Permanent Commission on Pharmacopœia (Den Permanente Farmakopo Kommission), which was last appointed on June 4, 1898, and is composed of three medical men (who are professors) and six apotekers (who are doctors of philosophy). Dr. E. Poulsson, the eminent Professor of Pharmacology of the University of Oslo, is chairman of the commission. The last Norwegian Pharmacopœia was issued in 1913. When a new Pharmacopœia is under preparation, as now, the Per-

manent Commission is extended by co-operating new members, *e. g.*, representatives for organic and inorganic chemistry, for pharmacognosy and, in addition, apotekers actively engaged in scientific work.

I am indebted for much of the above data to Mr. E. Rasmussen, president of Johan C. Martens and Co., of Bergen, and Professor E. Poulsson, of the University of Oslo.

Pharmacy in Italy

In Rome, as in Spain and Portugal, the drug stores are legally divided into two classes—the farmacia, sometimes spelled pharmacia —the professional store, and the drogheria (or drogueria, Sp.)— the commercial store. The former sells drugs, poisons, and dispenses prescriptions, in addition to doing analytical, chemical, microscopical laboratory work; the latter sells only commodities and drugs for kitchen use in ordinary households.

The pharmacy laws of Italy are very strict and are rigidly enforced. The number of farmacias in the cities of Italy is limited to the proportion of one to four thousand of population. The number of drogherias is, I believe, not limited. The quota for farmacias is now full, no pharmacist (farmacista) can own one unless he buys one already in existence. There are 250 pharmacies in Rome. The number of drogherias is unknown as they have no official standing.

Italy does not have any drug store ownership law, but the Italians have aimed at the same result by a different method. They have legally confined the sale of drugs, poisons and the dispensing of prescriptions, as well as analytical, chemical and microscopical laboratory work for the public, to the pharmacies, while the commercial drug stores are permitted to sell commodities and drugs for kitchen use in ordinary households only. Furthermore, the titles of the stores are kept very distinct. Legally, a pharmacy is a pharmacy, and a drug store is a commercial store only.

The relations between the professions of pharmacy and medicine in Italy are very harmonious. Some pharmacists even have a waiting room for medical patients, and when customers come who need medical treatment, they have them wait until a physician can come and prescribe for them. Sometimes the pharmacist (farmacista) will have quite a few patients waiting for the physician. And as the pharmacist is capable of doing competent analytical, chemical and microscopical work, it gives the physician the opportunity of rapidly

making accurate diagnoses based on laboratory findings. I suppose one might call such quarters a pharmaco-medical clinic. It is needless to say that the medical men appreciate this service and there is no dispensing by physicians, or any objectionable counter prescribing by pharmacists. The professional ethics of the situation are closely observed. The pharmacists and physicians, by the way, have no love for the drogherias and ignore them completely. Such stores are quite beyond the pale.

There is a school of pharmacy in Rome, Torino, Pavia, Bologna, Naples, Catania, Palermo and Pisa.* These are attached to universities. Their courses cover four years for the regular pharmacy course with three years practical experience, and five years for the courses leading to the doctorate degree in pharmacy, chemistry and allied sciences.

It is pleasing to note that Italian pharmacists have a working day of eight hours. On Sundays in Rome, each pharmacy is open only every fourth Sunday.

We may not be able in our pharmacies to follow the Italian practice of earlier closing and shorter hours, but a sixteen-hour working day in pharmacy, such as obtains in many of our stores at home, is unnecessary for the public service and unjust to the pharmacist. Surely some plan could be devised whereby our pharmacists could have fewer working hours and get far more out of life than they do now, especially on Sundays.

It is a real treat to have visited the pharmacies of Rome, with their fine professional atmosphere, and note the comprehensive and highly skilled service they render their public. It revives one's faith in the worthwhilenss of real pharmacy and should inspire us to promote the growth and development of professional pharmacy in our own country, which must come largely by securing the more active co-operation of the medical profession, as well as by our own efforts. In this way lies safety for the profession of pharmacy in the United States and better service for the public.

Much of the above data was given to me by Mr. Hugh F. Foster of the H. Roberts and Company, of Rome, to whose kind courtesy I am much indebted.

*Portugal has schools of pharmacy at Lisbon, Oporto and Coimbra; Spain, schools at Madrid, Barcelona, Valencia, Seville, Zaragoza and Santander.

Monaco and Its Pharmacies

Monaco with its 2000 inhabitants is an independent principality situated on a promontory of that name on the Mediterranean. It is the playground of the gambler. Its history, from the days of yore to the present, is replete with exciting incidents. Its old stores, old streets, old gardens, old pits and ramparts, its wonderful climate and scenery, and its harbor, are incomparable.

Monte Carlo, is, of course, the Mecca of the majority of visitors. Here games of chance of all kinds are daily and nightly played for large and small sums, ten francs being the minimum, and in beautifully furnished and brilliantly lighted rooms with the servitors all dressed in black. And here fortunes are won or lost. Here is exemplified the ever-living urge of men and women seeking something for nothing—to get rich quickly, and here humanity is seen at its worst. Men stake their all for better or worse, usually for worse, and losing, sometimes commit suicide. The claim that there is a suicide every day during the season is probably used for local color.

In few parts of the world can such a climate be found as in Monaco and its environs. The Bay of Monaco and its slopes has been said in the flowering season to "look like staircases situated full south with the sun's rays from dawn to sunset forming a unique paradise of light, heat and beauty." Here we have plants of all kinds clinging to the rocks, overhanging the sea, foreign trees of great variety such as the ficus gigantea of India, as well as orange and lemon trees, and flowers in the greatest profusion, including violets to such extent that their perfume spreads afar. It is said that one of the gardens of violets was leased years ago to Rimmel, the London perfumers, who built up their fortune with the perfume of this exquisite flower.

We noted, also, numerous farmacias and drogherias in Monaco (including three or four British chemists), sometimes almost side by side, as in other countries.

We were particularly impressed by a sign over the door of one pharmacy in Monaco. It read: *"Pharmacia Fidelis."* What a wonderful name for a pharmacy, for the real pharmacy! Faithful Pharmacy—ever faithful to its high duties and responsibilities, day and night. Ever ready to serve humanity. Faithful Pharmacist—ever helpful in times of sickness and distress, and at personal sacri-

fice, if necessary. Commercialism forgotten, service everything. Ever true to the highest principles and traditions of an ancient and honorable profession with 4000 years of service.

The owner of that store has a beautiful conception of pharmacy --one that gives honor to pharmacy and its work for humanity. "Man's inhumanity to man makes countless thousands mourn," as the poet says, but man's humanity to man makes countless thousands happy! And the true pharmacist of all nations renders a service to sick and suffering humanity that is often not appreciated or even adequately paid for—it is simply and unostentatiously done for the love of the work. Money secondary, human help everything. Whoever hears of a pharmacist getting wealthy and whoever hears of his many quiet deeds of kindness and charity to the poor? He is the guide, counsellor and the friend of his patrons. And his reward is chiefly in the moral and spiritual satisfaction that comes from helping others to help themselves.

Pharmacy in Germany

Dr. Otto Raubenheimer of Brooklyn has kindly furnished me with the following data upon the pharmaceutical practice and education of Germany:

Germany has a quota system of pharmacies, *i. e.*, professional stores (apothekes), and in the proportion of one to from 6000 to 10,000 of population, according to location. It has, also, commercial stores or drogeries (which cannot compound prescriptions, sell poisons, or mix drugs). It has a drug store ownership law and no chain stores.

In education, high school graduation is required for entrance, five years practical experience, two years for the pharmacy course, three years for the course for food chemist, and four years for the doctor of pharmacy course. There are twenty-five or more schools of pharmacy in Germany.

The three necessities to become an apotheker in Germany are:

1. *Admission to Preliminary Examinations.*

   The examination is written, practical and oral.

   1. Graduation from high school with knowledge of Latin.
   2. Certificate of two years employment as apprentice with apotheker.

2. *State Board Examinations.*

The examination is written, practical and oral.

1. Certificate of Preliminary Examination.
2. Certificate of one year's employment as an assistant in a German pharmacy.
3. Certificate of four semesters (2 years) of professional study in a German university.

3. *The Candidate (Qualified Assistant).*

The candidate, now a qualified assistant, must next practice two years in a pharmacy, and will then obtain his license as an apotheker with authority to conduct a pharmacy in Germany.

Pharmacies (Apothekes) are either sold, or when needed (and permission is obtained), may be opened. To obtain the concession, the apotheker must have, first, the necessary qualifications, and second, the capital.

Seldom are concessions obtained until the apotheker is fifty years old.

Pharmacy in Belgium

The pharmacy of Brussels is the pharmacy of Belgium.

Brussels with a population of 759,000 has 350 pharmacies, a ratio of about 1 to 2200. There is no quota system. The drug stores are professional with a few commercial drogueries selling package-drugs and other merchandise, as in Spain and Italy. There are no chain stores. The hours of work on weekdays are from 8 A. M. to 7 P. M. On Sundays and holidays ten pharmacies in the city are open all day, and the rest one half the day. Telephones connect with all the stores. The metric system of weights and measures is used, everything—solids, liquids, being weighed. Few or no hypodermic tablets are sold, ampoules are largely employed. No analytical, chemical or microscopical work is done, this being referred to outside experts.

The stores are under the jurisdiction of Belgian pharmacy laws; the drogueries must have qualified managers in charge. The Belgian Pharmacopœia is, of course, the official standard.

A pharmacien must have had four years study in one of the four universities of Belgium—Brussells, Louvain, Gand, and Liege, and one year's practical experience in a pharmacie. He receives on

graduation the degree of pharmacien-chimiste (pharmaceutical chemist).

I am indebted for the above data to the courtesy of Emile Stouffs, pharmacien-chimiste, 49 Avenue Louise, Brussels, Belgium.

Pharmaceutical Education in Holland

Professor Henry G. Greenish, of the Pharmaceutical Society of Great Britain, gives in the Pharmaceutical Journal of London (August 11, 1928, 156-158), a most interesting sketch of "The Pharmaceutical Laboratory of the University of Utrecht," which is doubtless typical of the other Dutch schools* of pharmacy; and the following data has been abstracted. He points out that according to recent researches the first pharmacy in Holland was established in 1276 when Jan Van Nassau, a statue to whom stands in front of the University, gave the cellar under his home situated by the Chapel of the Holy Cross to "nostro Anselmino apothekario."

"The University of Utrecht was founded in 1636, or about sixty-one years after that of Leiden (see Pharm. Journal, Vol. III, 559). It was enlarged in 1894, and the front is therefore modern. Theology, law, and philology are still taught in it, but for medicine, science, arts, and veterinary medicine, new and commodious buildings have been erected. It was here that Mulder worked on the making and composition of beer, that Donders laid the foundations of ophthalmology, that Magnus conducted his researches in pharmacology, Went in botany, and Cohen and van Romburgh in organic chemistry.

"The Pharmaceutisch Laboratorium is a large, handsome structure built about 1900 on the outskirts of the city, with a pleasant outlook on to the gardens bordering the Singel. It is arranged in the form of a square, enclosing an open space devoted, inter alia, to the cultivation of a number of medicinal plants and surrounded by a botanical garden.

"In Holland the qualification of pharmacist is obtained by passing several examinations at the University. For admission to these examinations the student must have matriculated either at the gymnasium (six years with a good deal of Latin and Greek) or at the

*The schools of pharmacy in Holland are those attached to the Universiteit van Leiden, Leiden, Holland; Universiteit van Amsterdam, Amsterdam, Holland; Universiteit van Groningen, Groningen, Holland; and University of Utrecht, Utrecht, Holland. (J. W. England.)

High School (five years with a good deal of physics and chemistry). The examinations at the University are:

"(1) Examination for candidate (about equivalent to the English B. Sc. This includes:

"(a) Chemistry, physics, and botany, or

"(b) Chemistry, physics, botany, and mineralogy, or

"(c) Chemistry, physics, botany, and zoology.

"The time occupied in these studies is three years.

"(2) Examination for doctorate (about equivalent to the English M. Sc.) This includes:

"(a) Pharmacy (chemistry, pharmacognosy, galenical pharmacy) and one of a number of branches—*e. g.*, toxicology, microbiology, pharmacology, hygiene, medical chemistry, etc., the candidate being allowed to choose one of the enumerated branches (two and one-half years).

"(3) Practical Examinations:

"(a) Preparation of chemical substances.
Chemical Analysis, both quantitative and qualitative.
Toxicology (analysis of foods and urine).
Pharmaceutical botany.

"(b) Preparation of galenical formulæ.
Dispensing.
Pharmacognosy.

"Candidates are not admitted to the last examination unless they produce a certificate that they have practised at least one year under a qualified pharmacist.

"Those who desire the degree of doctor (in the Faculty of Science there is only one degree—viz., Ph. D.) have to write a thesis.

"There is a minor examination for assistants in a pharmacy. This is not a University examination, and has no connection with the degree of pharmacy, though young students are generally advised to pass it before entering the University, or after having passed the candidates examination. Students intending to present themselves for this examination must have been trained in a pharmacy for one year.

"In the University of Utrecht students of pharmacy receive their training under Professors de Graaff and Schoorl, the former

taking pharmacognosy, galenical pharmacy, dispensing, medical chemistry, serology, microbiology, and the bacteriological and microscopical examination of foods, while Professor Schoorl is responsible for analytical chemistry, pharmaceutical chemistry, microchemistry, toxicology, and the chemistry of foods. Most of the lectures are delivered in the forenoon, the afternoons being devoted to practical work. The students number about fifty.

"About twelve rooms are under the direction of Professor de Graaff, and these are used for the practical work carried on by the students in the subjects taught by him, while the lecture theatre is at the disposal of both the professors. This has accommodation for about ninety students.

"At the back of the theatre is a raised platform with a lantern for projecting lantern slides, and a cinematograph for projecting films, reached by a flight of steps from the adjoining museum.

"The museum, which adjoins the lecture theatre behind the lantern platform, contains a good and well arranged, though not very extensive collection of drugs, cinchona barks and other East Indian drugs being particularly well represented. These specimens are not used by the students, a separate collection being provided for this purpose.

"Dispensing is taught in a room fitted up as a model pharmacy, in which there is space for about eight students to work at a time. Large and small balances, an autoclave and hot air steriliser are also provided, so that prescriptions for hypodermic injections and sterilised eye-lotions can be prepared there.

"The galenical laboratory is a spacious room with ample accommodation for carrying out pharmaceutical operations on a small scale. Amongst the apparatus provided are two stills, one for distillation under ordinary pressure and a smaller one for distillation under reduced pressure, the necessary evacuation being obtained by a Geryk oil pump driven by an electric motor, a large and small tincture press, a mass mixer, piping press and coating apparatus, percolators, tablet machine, etc., so that the student is able to carry out most of the processes for most galenical preparations.

"The microbiological laboratory is a somewhat smaller room arranged to accommodate about eight students at once; it is provided with all the necessary apparatus, such as autoclaves, incubators, steam and hot air sterilisers, etc. It is here that the students carry out their practical work in the preparation of vaccines, the bacterio-

logical examination of sterilised medicines, bandages, food materials, etc.

"The microscopical laboratory is a long narrow room fitted with working benches facing the large windows. At the back are lockers for miscroscopes, each student providing his own instrument. In this room the practical work in pharmacognosy is carried out, and it is admirably adapted for the purpose. The same room is also used for the practical work in microchemistry."

Pharmacy in France

The pharmacy of Paris is the pharmacy of France. There are 1500 pharmacies in Paris to a population of 3,000,000, or a ratio of 1 to 2000; and 1,500,000 population in the suburbs, with the same ratio. They are under the jurisdiction, of course, of the French pharmacy laws. They have laws, also, that correspond to our Federal Food and Drugs Act, and our Harrison Narcotic Act, and the laws are rigidly enforced. They have, in addition, a Pharmacopœia issued by a commission of physicians, pharmacists (pharmaciens) and a veterinarian, the last edition of which was issued in 1898; several supplements, however, have been issued since.

The pharmaciens of France are in a peculiarly fortunate position. They have very high standards of pharmaceutical education, and amazing to state, a drug store ownership law that has been in existence for more than thirty years and is most effective. They have a system of minimum resale prices on "patents" that affords them a fair profit and there is no cutting of prices as with us. They have no chain drug stores—the existence of such is illegal.

The pharmacies have a splendid professional atmosphere. I remember one in Paris near the Arc de Triumphe which had, in the center of the store, a large and beautiful bronze bust of Joseph Pelletier, the famous French pharmacist, "probably the most gifted worker scientific pharmacy has ever known, except Scheele" (La Wall), who with Joseph Bienaime Caventou, a retail pharmacist of Paris, "not as brilliant as his associate Pelletier with whom he worked for many years" (LaWall), discovered strychnine in 1818, brucine in 1819, and quinine in 1820, and who "were awarded a prize of 10,000 francs by the Paris Institute of Science for the discovery of quinine. This was their only reward, for these generous contributors to science took out no patents on their discoveries as they might

easily have done" (Four Thousand Years of Pharmacy, by Charles H. LaWall, 1927, 455, 456).

Furthermore, there is no quota system of stores, a pharmacien can own only one pharmacie, but he can associate himself in partnership with another pharmacien. The widow of a deceased owner of a pharmacie, under the drug store ownership law, must sell the store within one year after the death of the husband.

There are a few droguistes, so called, which sell gasoline, perfume, brushes and other merchandise, but no drugs.

The hours of work of a pharmacien are usually from 8.30 A. M. to 7 P. M. The city is divided into districts, and each can open all day on Sundays only once every five weeks.

The French have a Pharmaceutical Corps in their army and navy which rendered invaluable service during the World War. It is on the same plane as the Medical Corps. The United States has no such corps. During the World War strenuous efforts were made by our pharmaceutical organizations, the pharmaceutical press and pharmacists generally, supported editorially by the *Journal of the American Medical Association,* to induce Congress to enact legislation to establish such a corps, attention being called in detail to the character and extent of the splendid work done by the French Pharmaceutical Corps, but Congress and others in authority refused to act.

The Colleges of Pharmacy of France are of exceptionally high standard. They are located at Marseilles, Alger, Besancon, Bordeaux, Clermont-Ferrand, Dijon, Grenoble, Lille, Lyon Montpellier, Nancy, Poitiers, Rennes, Strasbourg, Toulose, and the famous Ecole Superieure de Pharmacie of Paris.

The pre-requisite for admittance of a student in a French school of pharmacy is a baccalaureate degree (bachelor or equivalent) and one year's practical experience in a pharmacie. After passing an examination on this work he studies at a school of pharmacy for four years (the minimum time), theoretically and practically, and on graduation receives the degree of pharmacien.

After graduation in pharmacy, the pharmacien not only practices professional pharmacy in the best sense of the word, but does extensive analytical, chemical and microscopical work for physicians and the public. The pharmacien makes many of his galenicals, and also manufactures and markets specialties of his own. Many pharmaciens specialize in chemistry and become chemical experts. They

bear the name of chimistes. Some become physicians. It is rather surprising to learn, in view of the number of pharmacies in Paris, that the Paris school of pharmacy has now more than 1200 students (about one-third of whom are women), but this is explained by the fact that the high scientific training of the graduates enables them to go into many lines of work other than retail pharmacy.

The French schools of pharmacy give no course of study for the degree of graduate of pharmacy as we do. Their courses in pharmacy are somewhat similar to the four years course of the Philadelphia College of Pharmacy and Science leading to the degree of Bachelor of Science in Pharmacy, which latter, by the way, qualifies in practical experience for examination and registration by our state boards of pharmacy.

The Pennsylvania State Board of Pharmacy requires three years of practical experience in pharmacy under the personal supervision of a pharmacist as a pre-requisite for application for examination and registration as a pharmacist. The state laws in this respect should be changed, as the conditions of the practice of pharmacy in the United States have radically changed since the passage of the laws—the practical instruction given in our average drug stores is of such limited scope and variable character that its continuance, as a pre-requisite for the examination and registration of pharmacists, is not justified. Instead, there should be compulsory attendance in a recognized college of pharmacy and credit given for the time spent in college laboratories in lieu of drug store experience, and one year of compulsory drug store experience *after* graduation, analogous to the custom of interneship in medical education, as advocated by Professor H. V. Arny.

The French schools of pharmacy require five years for a course of study leading to the degree of doctor in pharmacy (or a one year graduate course subsequent to the course in pharmacy), and a thesis. The Philadelphia College of Pharmacy and Science gives the degree of master of science for such a course, and requires three years of graduate study subsequent to the bachelor of science course in pharmacy before it awards the degree of doctor of pharmacy.

One of the most striking features of French pharmacy is the exceptionally cordial relations that exist between French pharmaciens and French physicians. This is explained by the fact that both are on the same educational plane. Both are required to have academical graduation as a pre-requisite for matriculation as students,

both frequently study together, and after graduation, both have the same professional standing. The physician does not "look down" (to use our vernacular) on the pharmacist, but meets him as a scientific and professional confrere. This is most suggestive to all of us in the United States and elsewhere who are working for the advancement of professional pharmacy and the betterment of the conditions of the practice of pharmacy.

I am indebted to M. Auguste Roger, pharmacien, owner of Beral's Pharmacy, established in 1816, 194 Rue de Rivoli, Paris, through whose kind courtesy I have obtained much of the above information.

Pharmacy in Great Britain

There are over 10,000 pharmacies in Great Britain with a population of 42,500,000, or a ratio of about 1 to 4000; there are over 2000 pharmacies and 150 chain drug stores in London with a population of 8,500,000, practically the same ratio. These are under the jurisdiction of laws which are analogous to our Federal Food and Drugs Act, and our Harrison Narcotic Act, and are strictly enforced. The official standard for the identity, purity, strength and quality of drugs is, of course, the British Parmacopœia, the last edition of which was published in 1914. It is revised by a Committee of the General Medical Council, the present chairman of which is Sir Donald MacAlister, Vice Chancellor of the University of Glasgow. It was most interesting to learn that, hereafter, as the result of the firm stand taken by the Pharmaceutical Society of Great Britain, which enlisted the support of the British Medical Association, the Institute of Chemistry, the Society of Public Analysts, and other bodies, the next revision of the Pharmacopœia will be effected by a Pharmacopœia Commission, on which these bodies will receive adequate and effective representation.*

*The names of the members of the Pharmacopœia Commission of the British Pharmacopœia, recently announced (*Pharm. Journ.*, Dec. 1, 1928) are: A. P. Beddard, M. D., F. R. C. P., consulting physician to Guy's Hospital, chairman; R. R. Bennett, B. Sc., F. I. C., technical director of The British Drug Houses, Ltd., and chairman of the British Pharmaceutical Conference; J. H. Burn, M. D., director of the pharmacological laboratory of the Pharmaceutical Society of Great Britain; F. R. Fraser, M. D., F. R. C. P., professor or clinical medicine in the University of London, director of the medical professorial clinic, and physician to St. Bartholomew's Hospital; H. G. Greenish, D. Sc., pharmaceutical editor of the British Pharmacopœia, 1914, Dean of the School of Pharmacy, and professor of pharmaceutics in the University of London; J. A. Gunn, M. D., D. Sc., professor of pharmacology in the University of Oxford; T. Tickle, B. Sc., F. I. C., public analyst to the County of Devon.

The hours of work of the British pharmacy, which are controlled by the Shop's Act, are from 9 A. M. to 7 P. M. in the city, and from 9 A. M. to 8 P. M. in the suburbs. On one weekday (the half holiday), the stores are closed at 1 P. M. The chain drug stores do not keep open on Sundays.)

It is estimated that the average net income of the British chemist (or pharmacist) before 1914 was about 300 pounds yearly; today, it is fully double this, and the chemist in determining his net income generally makes no allowance for the rental of his dwelling—in England and Wales he usually lives in the dwelling above his store. It is not uncommon nowadays for the British retail chemist to own a private automobile, a circumstance which would seem to argue a fair measure of prosperity, because the expense of keeping a car is a good deal higher than in the States.

Perhaps the most striking feature of British pharmaceutical practice today is the so-called Panel System of Drug Dispensing under the National Insurance Act of 1911, whereby national provision is made by contract with chemists for the payment of drugs and appliances dispensed to persons of limited incomes. The service is optional with the public and the contract is optional with the chemist. Legally, registration of the chemist as the individual owner of a business or as a manager for a body corporate (a limited liability company) by the Pharmaceutical Society of Great Britain is required of all who wish to contract with the government for such service. The prices allowed the chemist for material, fees for dispensing, etc., are scheduled and permit only a very small margin of profit, and if the panel physician prescribes excessively costly drugs, he may be surcharged by the Insurance Committee. In England and Wales the drugs and appliances are supplied at cost price, and the dispensing fee averages about 4.5d. In Scotland, which has retained, with some readjustments of detail, the original tariff of 1912, 50 per cent. is added to the cost price of drugs and appliances, and the average dispensing fee is between 5d. and 6d.

The procedure is as follows: The country is divided in areas, and in each area an Insurance Committee is set up, and this Committee enters into contracts with chemists, or chemist's companies, willing to supply drugs and appliances to insured persons. Such persons or firms constitute what is known as "Panel Chemists." Each of these contractors is responsible under the insurance laws to the

Health Department of the government through the local Insurance Committee.

The chemists are paid out of the National Drug Fund which is made up out of the contributions of employers, employees, and a small grant by the National Treasury amounting in all to about two shillings ten and one-half pence (about 75 cents) per person per year. The Fund is pooled and payments are made out of it proportionately to contract chemists as long as the fund lasts. If the fund becomes inadequate to pay all the bills, only part payments are made, and the balance sometimes may not be paid for several years. The fund is *now* distributed by a Committee of the Retail Pharmacists' Union; formerly it was distributed by the government directly.

There was a "discounting clause" in the original agreement entered into between chemists and Insurance Committees in 1912. This entailed such heavy losses on English and Welsh chemists that on the insistent and persistent representations of the chemists' negotiators, discounting was discontinued. But with the great rise in prices during and since the war, and the progressive increase in prescription frequency, the Drug Fund became insufficient to meet the expenditure. Deficits were paid by the Treasury, but under the Economy Act of 1926, these disbursements were stopped, and the Ministry of Health gave panel chemists the choice of a serious reduction in their rate of remuneration, or of themselves taking over and administering the Drug Fund. The latter option seemed the lesser of the two evils—the Retail Pharmacists' Union, which represents and acts for panel chemists in England and Wales, decided to make the experiment and thanks to their judicious management of the Fund, the measures taken by the Ministry of Health, the British Medical Association, and Insurance Committees, some economies have been, and are likely to be, effected, which have minimized discounting, and may ultimately obviate it.

The Retail Pharmacists' Union, which corresponds to our N. A. R. D., not only distributes the Panel Fund, but it is associated with the Chemist's Defense Association, which has established a system of insurance for chemists who wish to protect themselves against damages by legal action. By the payment of small annual charges, the chemist can protect himself up to the amount of 500 pounds, or even 1000 pounds. He is protected against *all* kinds of legal action, including compensation damages.

The Pharmaceutical Society of Great Britain,* which is the statutory body and authority under the Pharmacy Acts of 1852, 1868, 1898 and 1908, for the control of pharmaceutical education, qualification and registration, and the administration and enforcement of Pharmacy Law as embodied in the above mentioned Acts, corresponds to our American Pharmaceutical Association, and protects the professional side of British Pharmacy; and the records of its splendid services for the advancement of the science and art of pharmacy, not only in Great Britain, but throughout the world, forms one of the brightest chapters of pharmaceutical history.

Another subject of interest to the American pharmacist is the so-called P. A. T. A. (Proprietary Articles Trade Association) Plan for protecting the minimum resale prices of proprietary preparations, established in 1896 by the late lamented, and probably the most forceful figure in British Pharmacy of his time—Sir William Glyn-Jones. Naturally, with such a radical plan as this, there is bound to be, here and there, some differences of opinion as to its success, but I could find no "chemist" who would say that he was willing to go back to the pre-P. A. T. A. days. The opinion generally expressed was that the plan was "most satisfactory." The surprising fact was told me by Sir Glyn-Jones, when he was last in America, that the most enthusiastic supporters of the P. A. T. A. Plan in Great Britain were the chain drug stores! (May there not be a suggestion in this for use at home?)

Pharmaceutical students in Great Britain, Ireland† excepted, must have certificates of high educational standard, and are required to pass a Preliminary Examination before they can enter on apprenticeship. The examinations are held in various cities about four

*"The Pharmaceutical Society of Great Britain was establishedin 1841 "for the purpose of advancing Chemistry and Pharmacy, and promoting an uniform system of education of those who should practice the same, and also for the protection of those who carry on the business of chemists and druggists"; also "to provide a fund for the relief of distressed Members and Associates of the Society, and of their widows and orphans." A Royal Charter of Incorporation was granted to the Society in 1843. Its School of Pharmacy was founded in 1842, and is now a School of the University of London. In 1888 the Society founded Research Laboratories in connection with the School; in 1926 a Pharmacological Laboratory, and in 1927, a department of the Laboratory for the testing of material for vitamin content.

†The qualification to practice pharmacy in Great Britain does not entitle its holder to practice pharmacy in Ireland, nor are the certificates of the Pharmaceutical Society of Ireland, or of the Pharmaceutical Society of Northern Ireland recognized in Great Britain, but there is reciprocity with Ontario (Canada) and the Australian States, Tasmania and New Zealand.

times a year by approved educational and examining boards, which include universities, colleges, and secondary schools.

There are about twenty-five colleges of pharmacy in London and environs; more of course in Great Britain. The schools vary in their manner of giving the courses of instruction. Some give full time (day) courses in preparation for the examinations of the British Pharmaceutical Society (which is legally under the Pharmacy Acts of 1852 and 1868 the National Pharmaceutical Examining Body), and for the university courses leading to a pharmaceutical degree. Other schools give both part-time courses, day and evening, and full-time courses.

The full-time courses are as follows:

(1) A one year (nine months) course (Part 1) leading to the "Preliminary Scientific Examination," which corresponds to our *first-year* graduate in Pharmacy (Ph. G.) course.

(2) A one-year (nine months) course (Part 2) leading to the "Chemists and Druggists Qualifying Examination," which, with the Preliminary Scientific Course, corresponds to the two years Pharmaceutical Graduate (Ph. G.) course of the United States, (now being rapidly superseded by the three years Ph. G. Course). The graduate of the British course receives *no* degree, but may append to his name "M. P. S." meaning Member of the Pharmaceutical Society of Great Britain.

(3) A two years course leading to the "Pharmaceutical Chemists Qualifying Examination." It gives no degree. The school of pharmacy of the Pharmaceutical Society is now affiliated with the University of London, which provides both for a two years course in pharmacognosy and pharmacy for the Pharmaceutical Chemists Qualifying Examination, and for the degree of B. Pharm. of the University of London. (The Philadelphia College of Pharmacy and Science gives a four years course leading to the degree of Pharmaceutical Chemist (Ph. C.), the last year of which is a graduate year subsequent to its Ph. G. Course; it gives, also, a four years course leading to the degree of Bachelor of Science in Chemistry (B. Sc. Chem.))

(4) A three years course leading to the examination (intermediate and final) for the degree in pharmacy of B. Pharm. of the University of London and other universities. The University of Glasgow and other universities give a three years course for the degree of B. Sc. Pharm. The Philadelphia College of Pharmacy

and Science gives a four years course leading to the degree of Bachelor of Science in Pharmacy (B. Sc. Pharm.).

The part-time and full-time courses are usually given as part-time day and evening, or evening courses, or full-time six and nine months courses for the "Preliminary Scientific Examination," and as full-time, nine months courses, for the "Chemists and Druggists Qualifying Examination."

I am indebted for much of the above data to Mr. J. A. Kenningham, organizing secretary of the P. A. T. A., Dr. Henry S. Wellcome, of Burroughs, Wellcome and Co., to Mr. C. H. Ratcliffe, of Menley James, Ltd., and especially to Dr. J. P. Gilmour, Editor of the Pharmaceutical Journal of London.

Let us compare the conditions of pharmaceutical practice and pharmaceutical education abroad, and at home, especially the practice of professional pharmacy, as follows:

Drug Store Types

1. *Norwegian—Swedish Type.*

   Quota system of stores.
   Professional store (Apoteke).
   No individual commercial stores.
   No corporate commercial stores (chains).

2. *Spanish—Italian Type.*

   Quota system.
   Professional store (Farmacia).
   Individual commercial store (Drogueria, Sp.), (Drogheria, Ital.).
   No corporate commercial stores (chains).

3. *German Type.**

   Quota system.
   Professional stores (Apotheke).
   Individual commercial store (Drogerie).
   No corporate commercial stores (chains).
   Drug store ownership law.

4. *Belgian Type.*

   No quota system.
   Professional store (Pharmacie).
   Individual commercial store (Droguerie).
   No corporate commercial stores (chains).

*Data furnished by Dr. Otto Raubenheimer.

5. *French Type.*
   No quota system.
   Professional store (Pharmacie).
   No individual commercial stores.
   No corporate commercial stores (chains).
   Drug store ownership law.

6. *English Type.*
   No quota system.
   Professional stores (few).
   Professional and commercial stores (many).
   Individual commercial stores.
   Corporate commercial stores (chains).
   No drug store ownership law.

7. *American Type.*
   No quota system.
   Professional stores (few).
   Professional and commercial stores (many).
   Individual commercial stores.
   Corporate commercial stores (chains).
   Drug store ownership law (in New York State).

Pharmaceutical Education Types

1. *Norwegian—Swedish Type.*
   Four years Practical Experience.
   Two years Pharmacy Course (about).
   No degree given; title of Apoteker only.

2. *Spanish—Italian Type.*
   Three years Practical Experience.
   Four years Pharmacy Course (for Farmaceutico, Sp.), (Farmacista, Ital.).
   Five years for Doctorate Degree.

3. *German Type.**
   Entrance Examination.
   (High School Graduation.)
   Five years Practical Experience.
   Two years Pharmacy Course.
   Three years Course for Food Chemist.
   Four years Course for Doctor of Pharmacy.

4. *Belgian Type.*
   Entrance Examination.
   One year Practical Experience (in a Pharmacy).
   Four years Pharmacy Course, Theoretical and Practical (Pharmacien-Chimiste Degree).

*Data by Dr. Otto Raubenheimer.

5. *French Type.*
   Bachelor Degree for Entrance.
   Three years Practical Experience.
   Four years Pharmacy Course (for Pharmacien).
   Five years Course for Doctorate Degree.

6. *English Type.*
   Entrance Examination.
   Two years Course for Chemist and Druggist, but no degree.
   Two years Course for Pharmaceutical Chemist, but no degree.
   Three years Course for Bachelor of Pharmacy or Bachelor of Science in Pharmacy and Degree.

7. *American Type* (P. C. P. and S.)
   State Entrance Examination or equivalent.
   Three years Practical Experience.
   Three years Course for Pharmaceutical Graduate Degree.
   Four years Course for Bachelor of Science in Pharmacy Degree.
   Three years Course for Pharmaceutical Chemist Degree.
   Four years Course for Bachelor of Science in Chemistry Degree.
   Seven years Course for Doctor in Pharmacy Degree.
   State Board Examinations to Practice Pharmacy, and a pre-requisite of college graduation before examinations, by many states.

Analyses of these data show wide differences, and it is difficult to draw conclusions, except that the practice of pharmacy is at its best in those countries in which the educational standards are the highest, and in which professional pharmacy is the dominant note; also, in which the practice of pharmacy has the active co-operation and support of the medical profession.

The European quota system of professional pharmacy is not possible in the United States, and without medical co-operation the protection and advancement of professional pharmacy in this country is exceedingly difficult.

Unquestionably, the profession of pharmacy in the United States (and in Great Britain) is facing, and being influenced by, the ever-increasing competition of purely commercial concerns, and is in danger of being submerged by commercialism, and the big question of today, in the minds of all those who are anxious for the future of professional pharmacy is: "What is the remedy?"

In 1927 the State of Pennsylvania enacted the so-called "Pennsylvania Drug Store Ownership Law" (Approved May 13, 1927), which provides that every pharmacy or drug store in the State shall be owned only by a licensed pharmacist, and that no corporation, association or co-partnership shall own a pharmacy or drug store

unless all the partners or members thereof are licensed pharmacists, excepting that those already in business may continue to do business but shall not have the right to open any new stores.

The constitutionality of the law was soon attacked in the District Court of the United States for the Eastern District of Pennsylvania, and the decision of the Court on December 8, 1927, was that the law was constitutional.

The decision was then appealed and carried to the U. S. Supreme Court which, on November 19, 1928, reversed the decision of the lower court, and declared the law unconstitutional and void.*

From this decision there can be no appeal. It is final. And the future development and progress of professional pharmacy in this country must come, apparently, through education and co-operation with the medical profession.

Several lines of educational action have been proposed, as follows:

(1) Continue both the present three year Pharmaceutical Graduate (Ph. G.) Course and the present four year course of Bachelor of Science in Pharmacy (B. Sc. Pharm.) in the colleges of pharmacy, the courses being optional, or

(2) Abolish the Ph. G. Course altogether, and substitute the B. Sc. Course for it.

The first plan is the conservative one, but it will take years before the B. Sc. graduates can become general; the second is the radical one, but it has much to commend it.

The American Association of Colleges of Pharmacy believes that the best procedure is through higher education, in which thought it is supported by the National Association of Boards of Pharmacy. At its 1928 meeting at Portland, Maine, it voted in favor of abolishing the three years Pharmaceutical Graduate (Ph. G.) Course in colleges of pharmacy, and substituting for it the four years Bachelor of Science in Pharmacy (B. Sc. Pharm.) Course; this to become effective in 1932. Obviously, such action of the American Association of Colleges of Pharmacy can become effective only when approved by the administrative authorities of the colleges represented by the membership.

The Association represents, in its membership, a large majority of the seventy-odd colleges of pharmacy of the country.

*Whether or not this decision automatically nullifies the Drug Store Ownership Law of New York State is a legal question.

The State Boards of Pharmacy generally have the legal power given them by State Legislatures to define what shall constitute a "recognized" college of pharmacy, and in many states to require that the applicant for examination as a registered pharmacist must be, as a pre-requisite, a graduate of a "recognized" college of pharmacy.

So far as the rumor that one college of pharmacy in the country will start giving the B. Sc. Course in 1930 (and not in 1932) is concerned, and thus "get-the-jump," so to speak, on the other colleges, this would be futile, because it would be one college against the whole field, and if given the option of a three years course or a four years course in pharmacy, the pharmacy students of today would take the shorter course and not the longer.

But it is not enough that the courses of instruction be lengthened. If the experience of the European schools counts for anything, the courses of instruction in the American schools must be developed and expanded along professional lines so that it will secure the active and whole-hearted co-operation of the medical profession, not only in protecting the sister profession of pharmacy against possible extinction, but in advancing the interests of medicine itself.

As I have written elsewhere ("Save Professional Pharmacy," *Pharmaceutical Journal of London,* August 25, 1928, 202): "Pharmacy—professional pharmacy—and professional medicine are interdependent. Pharmacy, broadly speaking, is a branch of therapeutics—one of the key sciences and arts of medicine—and any movement that would help therapeutics would help medicine. Medicine deprived of professional pharmacy would be deprived of its 'first aid.'"

The way to secure medical co-operation, however, is by deserving it. During the past few years there has been a remarkable development in clinical laboratory technique—in biochemical methods of clinical diagnosis. As the "London Lancet" (July 2, 1927) has stated: "These changes are reflected in the training of medical students which, in contrast with the system that was practiced in the days of our grandfathers, is new land in a new science." Bacteriology, blood counts, sera, vaccines, insulin, etc., are, as E. Saville Peck (*Pharm. Journal* 1927) points out, all things that belong to the newer school.

The professional pharmacist by reason of his training along chemical lines could readily become a biochemist or clinical labora-

tory technician, and make himself invaluable to the medical practitioner by analyses of body fluids, blood counts, etc. Such a service, if extended throughout the country, would enormously increase the laboratory facilities of the general medical practitioner, and make for prompter and more skilled diagnoses, and for the betterment of the public health of the whole country, provided, of course, that the professional pharmacists who essayed such work were properly trained and equipped for it, and provided, also, and equally important, that medical practitioners generally would fully co-operate and avail themselves of such facilities.

Economically, the advanced course of instruction proposed for students in pharmacy would, in all probability, decrease the number of colleges of pharmacy in the country, decrease the number of students in the colleges, and decrease the number of drug stores, a result that would be hastened, possibly, by the constantly increasing competition of commercial drug stores, both individual and corporate (chains), and also, by the competition of the American chain grocery stores which, it is rumored, will soon stock and sell a full line of patent medicines. "For some time past," states the *Pennsylvania Pharmacist* (September, 1928, 24), "the chain grocery stores have been carrying certain brands of talcums, peroxide and cough syrups. Where will this all end? Will the chains, which today control 80 per cent. of the retail grocery trade, eventually control the greater percentage of the patent medicine business?"

And not only do drug stores face possible competition by the chain grocery stores, but competition, also, by the chain tobacco stores. W. T. Posey, vice-president of the United Cigar Stores Company has recently stated (*Druggists Circular,* October, 1928, 30): "Chain store systems as far as cigar and cigarette distributors are concerned have been passing through another stage of development, and within the next few years the majority of stores, instead of retailing merely tobacco products, will have broadened out to include drug and other kindred lines of quick turnover small merchandise."

Professional pharmacy has nothing to fear from the competition of the chain stores so long as the latter do not commercialize professional pharmacy and submerge it. If this can be prevented, either by legislation or education, or both, and the number of professional drug stores can be materially increased, and can secure the active co-operation and support of the medical profession, then the future of pharmacy is safe.

THE ROMANCE OF BEVERAGES*

By Charles H. LaWall

"Water, water everywhere
Nor any drop to drink."

AND SO WE EMBARK on a voyage concerning liquid refreshment with a quotation which is as familiar as any that could be selected, and as non-committal. Indeed, he who lectures upon a subject with such a title must be prepared in advance to lose half his audience if he devotes too long a time to either of the two great parts into which the subject may be divided, for only a small proportion of people are amphibious in this connection.

Charles H. LaWall, Ph. M. Sc. D.

Perhaps I may succeed better if I arrange my sub-topics in successive layers—a sort of verbal *pousse-café,* so to speak; but already I have transgressed in naming a drink which is under the ban of the law. I do not wish to make such a mistake as was made by the clergyman who unthinkingly selected "Oh, Happy Day" for one of the hymns to be sung at the close of a stirring sermon on prohibition. Hum it over to yourself and see whether it suits the occasion. Neither shall I denature the facts as the committee denatured the poem entitled *Mare Rubrum,* which was submitted by Oliver Wendell Holmes for a certain convivial occasion.

The word "beverage" comes from the same root-word as do the words "bib" and "bibulous," and the word "drink" comes from the same original source as the words "drown" and "drunken"; so from the beginning to the end of our existence we are encompassed by the vicissitudes and hazards of a craving for liquids, a craving which is sometimes physiological and sometimes pathological, but a craving which is always real.

Considering that in our physical make-up we are largely composed of water (and some of us are more highly diluted than others) we come by a desire for liquid refreshments naturally. For a normal individual, living under normal conditions, on a normal diet, water

*One of a Series of Popular Science Lectures, Presented by Members of the Faculty of the Philadelphia College of Pharmacy and Science, 1929 Season.

satisfies every physiological need, and yet, so few of us lead normal lives that we are rarely satisfied with the necessities of life. We either want the water flavored, sweetened, and effervescent, or we want one of the numerous substitutes which man seems to have craved since his cradle days in the forgotten past, when *pithecanthropus erectus* accidentally allowed a vessel of fruit juice to stand a day too long, and after drinking the resulting liquid was transformed into *homo sapiens*.

I am reminded here of a German verse which once appeared as a mural decoration in a well known Philadelphia restaurant, now no longer in existence, for obvious reasons:

"Das wasser ist zu jeder zeit
Die beste aller Gottesgaben;
Doch, lehrt mich mein bescheidenheit
Mann muss nich immer besten haben."

And so we find that this modesty has led man into devious paths which we shall follow for a time in the hope of finding facts and fancies for an hour's enjoyment. We are not going to spend any time discussing the liquid that made the old oaken bucket and the cataract of Lodore famous. We admit its value and necessity.

"Traverse the desert and ye can tell
What treasures exist in the cold deep well;
Sink in despair on the red parched earth,
And then ye may reckon what water is worth."

Kipling knew a thing or two about water, for when he wrote *Gunga Din* he says:

"Ye may talk o' gin and beer, when you're quartered safe out here
And sent to penny fights and Aldershottit,
But when it comes to slaughter, you'll do your work on water
And you'll lick the bloomin' boots of him that's got it."

We shall not visit the famous spas or watering places of history, for here the subject begins to border on the therapeutic side, and with that we have nothing whatever to do. We shall confine ourselves to the things that men have drunk for the sake of drinking, or as substitutes for Adam's ale. The very work "drink" is ambiguous. If you ask a person the question "Do you drink?", he may take it either as an insult or as an invitation, but the thought of water is usually remote.

Social drinking is as old as society itself, and whether the beverage is served in public or in private, and entirely irrespective of its character, there is a psychological need which is satisfied as well as one that is physiological. The reasons for drinking have been summarized in verse form by a sixteenth century poet:

"If all be true that I do think,
There are five reasons we should drink.
Good wine, a friend, or being dry,
Or lest we should be by and by,
Or, any other reason why."

A later version equally unrestricted in its terms is this:

"There's a rule to drink
I think,
A rule of three,
That you'll agree
With me
Cannot be beaten
And tends our lives to sweeten:
Drink ere you eat
And while you eat
And after you have eaten."

Let us not, in our academic consideration, at least, exhibit the Moslem's abhorrence of alcoholic beverages. It is said in this connection that if one digs a hole in the ground and pours therein a single drop of alcohol, and if the hole is then filled up with earth, and grass planted on the spot, a true Moslem may not eat of the flesh of a sheep that grazes on that spot.

There is a wide gulf between the adherents of Old King Cole and John Barleycorn on the one hand and Little Miss Muffet and Jack and Jill on the other, and he who seeks to pursue the middle course finds himself between the upper and the nether millstones.

But let us take the plunge "with malice toward none and charity for all," and as a beginning see whether we can discuss the beverage made famous by being dedicated to Bacchus, without starting any of the revels made notorious by the same ivy crowned god of ancient Greece, who had almost as many aliases as a Chicago racketeer. Bacchus, who is supposed to have introduced the cultivation of the vine, and who is synonymous with Dionysius, is said have sprung from the thigh of Zeus and to have come to Europe from India by way of Egypt. The accompaniments of Bacchus in painting

and sculpture, were the vine, the ivy, the thyrsus, the wine cup, and the panther. One curious chronological error or inconsistency exists in the statue of Bacchus. It is that the early representations of him show him as a mature bearded man, while those of later centuries portray him as a beardless youth. Perhaps his wine had the effect of an elixir of youth, and not only preserved but rejuvenated his memory.

The ivy with which Bacchus was crowned has added significance when we learn that the berries and the leaves, when made into an infusion, were taken as an antidote to bad wine. A sprig of ivy was often hung before a wine shop, which later gave rise to the saying, "Good wine needs no bush."

The Bacchus-admiring Greeks believed that the amethyst would protect the wearer against drunkenness, and the word "amethyst" comes from Greek root words which convey this meaning. Not all persons who wear amethysts, however, use them for this purpose.

Reproduction of Ancient Frieze Showing Procession of Bacchus

BIBLICAL BEVERAGES

Before the time that Bacchus made the vine famous in the Mediterranean countries, Noah had contributed his share to the gayety of nations in Palestine. "And Noah began to be a husbandman, and he planted a vineyard." Noah had seen enough water to last him for a while, says one early commentator. Another early writer explains in detail the reason which led Noah to specialize in grapes. Noah had observed that a goat that had eaten of wild grapes became very frisky and fought with great courage. Noah planted a cutting of this particular vine and fertilized it with the blood of a lion, a lamb, a hog, and a monkey. This is supposed to account for the contradictory attributes which wine inspires in different persons, and so we have boldness, meekness, filthiness, and obscenity engendered by the fermented juice of the grape.

There will be no attempt to discuss varieties or vintages of wine, much less the many descriptive names. Still or sparkling, sweet or

dry, harsh or smooth—wine is the fermented juice of grapes particularly, and of other fruits occasionally. There were no laws among the Greeks and Romans prohibiting the adulteration of wine, and so certain practices grew up which may account for the early demise of certain rulers of classical Greece and Rome. The wine makers of early times had learned empirically that the addition of sugar of lead or of litharge made harsh wines milder and aided in their preservation. Both of these substances are slow poisons, but were not generally recognized as deleterious until very recent times, in spite of the fact that Vitruvius, a Roman engineer of the time of Julius Caesar, had described the symptoms of chronic lead poisoning with great accuracy, and even in Seventeenth century Germany we find physicians defending the use of lead compounds in preserving wines. The Greeks and Latins had also learned the art of "plastering" wines with gypsum to improve their quality, and this less harmful practice has continued in some European countries down to the present time.

Jesus' first miracle consisted in changing water into wine at the marriage feast at Cana. It will suprise many to learn that this miracle was claimed to have been repeated at least twelve times by early Christians of prominence who were later canonized for their good deeds. Among these may be mentioned St. Adelm, St. Agnes, St. Arbert, St. Gerard, St. Gerlac, St. Guido, St. Odilo, St. Vaast, St. Victor, St. Zita, Peter Celestine, and Peter the Hermit, the last of these transformations having taken place as late as the thirteenth century. Each of these miracles is described in great detail, no two of them being exactly alike.

Wine drinking was so common a custom in biblical times as to call for no particular censure except from St. Paul, and he had his reservations. It will be remembered that at the feast of Pentecost, when the disciples are said to have spoken in foreign tongues and unkind critics said "These men are full of new wine," Peter in indignation replied "These men are not drunken, as you suppose, seeing it is but the third hour of the day." The name *Lachrymae Christi* (literally, Christ's tears) was given to a variety of wine without any intended irreverence.

There have been many noted wine drinkers as well as many famous varieties of wine. Darius the First, who was nicknamed the "Huckster" because of his interest in trade, and who is chiefly

remembered for what he did to Babylon, wished the following epitaph to be placed upon his tomb:

"I could drink much wine and bear it well."

Philip the Macedonian who when in his cups snubbed a woman who had come to him for justice gave his quick witted subject an opportunity for repartee which has come ringing down the centuries, for when the woman exclaimed indignantly "Philip, I shall appeal against this judgment," and Philip thundered in kingly rage "To whom will you appeal?", the woman replied, mildly but effectively, "I shall appeal from Philip drunk to Philip sober."

The libations of the Greeks and Romans which usually consisted in pouring a small portion of the wine either on the ground or on the sacrificial victim on the altar, were paralleled by the drink offerings of the ancient Jews. The Romans had a non-alcoholic wine called *Adynamon* (literally meaning, without power) which was much used by Roman matrons as a tonic beverage.

Beginning with the sixteenth century there were many liquor loving litterateurs and laureates in England, and one of the nicknames of Ben Johnson was the "canary bird," because of his fondness for Canary wine. Ben did not always agree with the motif of his famous song "Drink to me only with thine eyes." The drinkers in those earlier days were discriminating and one of the most famous of these upon having received a present of some sherry sent as a remedy for his gout said, "I have tried your sherry and prefer the gout."

Capacity was estimated not by ordinary units of measurement such as drams or gills but by bottles, and the terms "one," "two" and "three bottle men" were in common use. One of the latter who was interrogated with surprise with the question "Have you finished all three bottles of port without assistance?" replied "Oh, no! I had the assistance of a bottle of madeira." If tradition is to be believed the Duke of Clarence who was drowned in a butt of malmsey, was one of the few English noblemen who died of drink without being drunk, for the period was one in which the expression "drunk as a lord" probably had its origin.

Sack is an unexplained mystery of Tudor times. It is believed to have been a dry, rough wine brought from the Canaries to Spain and thence to England, and was much used in punch and posset. It is mentioned frequently in the writings of Pepys, Evelyn, Shakespeare, and Beaumont and Fletcher. Posset is a drink made from

wine, milk and eggs which was popular in Shakespeare's time, for he says: "We'll have a posset at the latter end of a sea coal fire." It was made from any available kind of wine or even from cider or perry. One of the most popular varieties was a sack-posset, the recipe for which was immortalized in verse which starts off like this:

> "From famed Barbadoes on the Western main
> Fetch sugar, ounces four; fetch sack from Spain,
> A pint; and from the Eastern Indian coast,
> Nutmeg, the glory of our Northern toast."

and so on until ten eggs and a quart of milk have been added, and the whole brought to the boiling point. One of the favorite possets was called the Pope's posset.

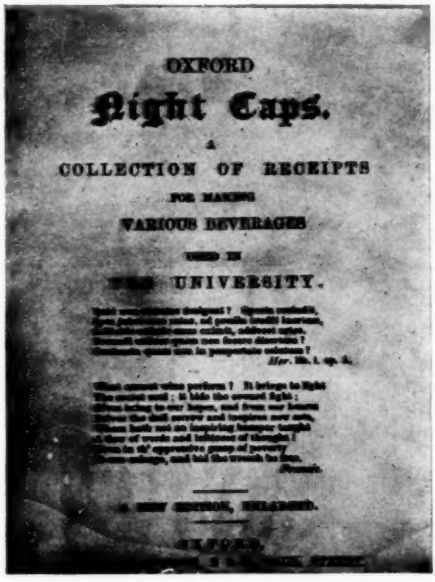
In the time of the Tudors and earlier it was customary, at coronation feasts or banquets, to dilute the wines and to cover their harshness by mixing them with honey or spices. When thus compounded by the apothecaries, who were in the technical Latin of the time called *pigmentarii,* these preparations, which were much like our modern liqueurs, were called "pigments" and are frequently referred to by Chaucer and other early English writers. One of these was called "Hippocras" because it was strained through an apothecaries' filter of peculiar form called "Hippocrates sleeve." These mixed wine drinks were very popular in England; in fact, they had not only custom but authority to sanction their use.

OXFORD NIGHT CAPS

An interesting confirmation of this is found in a little handbook which is still published, called *"Oxford Night Caps*—A Collection of Receipts for Making Various Beverages used in the University." Published in Oxford, England. In this *Vade Mecum* will be found detailed recipes for more than fifty such compounded drinks. The names themselves are intriguing. The ecclesiastical requirements are satisfied by "Bishop," "Cardinal," and "Pope." "Negus" and "cobbler" are in close rivalry with "julep," while nearly a score of varieties of "punch" take up the greater part of the book. "Possets" and "cups" are close to the punches in point of numbers, while scattered through the list are interesting titles such as "Rumfustian," "Swig," "Lambswool," "Metheglin," "Rum Booze," "Beer Flip," and others. This little work is more than a receipt book; it is a mine of information both historical and etymological, and is adorned with quotations from the

poets and classic writers. The title page contains a Latin quotation from Horace, and the following:

"What cannot wine perform? It brings to light
The secret soul; it bids the coward fight;
Gives being to our hopes, and from our hearts
Drives the dull sorrow and inspires new arts,
Whom hath not an inspiring bumper taught
A flow of words and loftiness of thought!
Even in the oppressive grasp of poverty
It can enlarge, and bid the wretch be free."


OXFORD
Night Caps.
A
COLLECTION OF RECEIPTS
FOR MAKING
VARIOUS BEVERAGES
USED IN
UNIVERSITY.

Title-Page of "Oxford Night Caps"

In this Oxford book we learn that Negus is the family name of the originator of this drink; that julep is a sweet drink of Persian origin which Milton extols:

"Behold this cordial julep here,
That flames and dances in his crystal bounds
With spirits of balm and fragrant syrups mixt."

Also that punch comes from the Sanskrit *pancha,* meaning five, because a properly made punch contains five ingredients—spirit, acid, spice, sugar and water. We are informed that cider cup and perry

cup (perry being the name for pear cider) owe their virtues to the sprigs of fresh herbs, balm and borage, placed therein; balm, because it is "very good to help digestion," and borage, because it is "of known virtue to revive the hypochondriac and cheer the hard student."

The "wassail" or "swig," as it is called at Jesus College, is a combination of sherry, beer, nutmeg, ginger, sugar, lemon, and toasted bread. Our custom of drinking what we call "toasts" originated at a time when toast was an ingredient of many drinks. The word wassail comes from the ancient Saxon *wass-hael,* and is given in German as *wacht heil.* It is really a salutation equivalent to saying "Your good health."

"Then lift the can to bearded lip
And smite each sounding shield
Wassail! to every dark ribbed ship,
To every battle field."

"Lambswool" is a corruption of *La mas ubal*—the day of the apple fruit—and is made from apples, ale, sugar, nutmeg, and ginger. It was the favorite drink of the Hibernians before they invented *uisge beatha,* literally, water of life, which we have changed into the name "whisky," and which is also called "poteen." "Metheglin" or "mead" is probably derived from the Welsh "Mevdyglyn," a popular drink of the early Cymrics. It is made by fermenting a mixture of honey, spices, and water.

"The juice of bees, not Bacchus, here behold,
Which British bards were wont to quaff of old;
The berries of the grape with Furies swell,
But in the honeycomb the Graces dwell."

Perhaps it was metheglin which had been drunk the night before by William of Normandy who, after the battle of Hastings, said: "I care not who makes these barbarians' wines; send me the man who can remove the beehive from my overwrought brain."

The maximum price fixed by law during the sixteenth century for the sale of wine was twelve pence per gallon. But "why bring that up?"

We shall close this section with another German quotation, the sentiment of which still has supporters:

"Wer liebt nicht wein, weib und gesang,
Der bleibt ein narr sein leben lang."

THE STORY OF TEA

And now, for fear we may have had too much exhiliration in connection with the discussion of wine, let us turn our attention to the milder beverage tea, for a short time. Here we have a startling statement to make, to begin with. *The birth of the United States as a nation was due to a three-penny tax on tea.* Not but that there were other factors of importance, but during that critical period preceding the Declaration of Independence, when laws oppressing the colonists had been passed and then either repealed or not enforced, the tax on tea was pressed to

The Tea Plant in Blossom

the point where public patience became exhausted. Indeed, Lord North had declared his willingness to repeal all other taxes, but he promised *Georgius Tertius* that "he would maintain this one tax on tea to prove to the colonists his right to tax them."

There is no need to recount the incident of the Boston Tea Party nor to describe the public meeings that were held in other prominent cities, but the fact seems to be plainly established that this one feature of the oppression seemed to change the previous lethargy of the colonists into concerted action toward the maintenance of their inherent rights as they saw them.

The interesting part of the story of tea, probably the world's most popular beverage, is that its early history is involved in almost impenetrable obscurity. We can understand the perfectly logical manner in which a substance like wine, which is a fruit juice that has undergone certain natural changes which may be entirely spontaneous, might be accidentally discovered and frequently is re-discovered, even in our own time, but when it comes to the selection of this particular shrub, the leaf of which requires some kind of careful preliminary manipulation, and from which the beverage is subsequently prepared by infusion with boiling water, the whole procedure is more or less complicated and accidental discovery seems almost out of the question. Hence it is that there are various fanciful legends that are supposed to account for the origin of the use of tea, none of which are convincing.

The most plausible reason is that in a country where the water is unsafe for drinking purposes unless it has been boiled, there would be more or less empiric experimentation in the hope of finding something that would make boiled water more palatable. Some warrant is given for this view by a statement regarding tea which is attributed to Chin-Nung, a celebrated scholar and philosopher who antedated Confucius. He said: "Tea is better than wine for it leadeth not to intoxication, neither does it cause a man to say foolish things and repent thereof in his sober moments. It is better than water for it does not carry disease; neither does it act as a poison, as does water when the wells contain foul and rotten matter." This is very significant as showing the Chinese to have suffered from water pollution from the earliest times, and it is remotely possible that in the attempt to cover the flat, insipid taste of boiled water the virtues of this particular shrub should have been discovered.

One of the earliest detailed references to the manner of preparing tea is found in a manuscript of Kieulung in the fourth century, as follows: "On a slow fire set a tripod whose color and texture show its long use, and fill it with clear snow water. Boil it as long as would be sufficient to turn crayfish red, and throw it upon the delicate leaves of choice tea. Let it remain as long as the vapor arises in a cloud and only a thin mist floats on the surface. Then at your ease drink the precious liquor so prepared, which will chase away the five causes of sorrow. You can taste and feel but not describe the state of repose produced by a beverage thus prepared."

In the seventh century a learned Chinese named Lo-Yu was as enthusiastic in its praises as some of its later supporters who considered it more of a medicine that a beverage. He said: "It tempers the spirits, harmonizes the mind, dispels lassitude and relieves fatigue, awakens thought and clears the perceptive faculties."

And now comes a very interesting part of the story of tea. There is no word for tea in the Sanskrit language, nor does it appear to have been known to the Egyptians, Babylonians, Greeks, or Romans. It seems not to have reached Japan until the ninth century. It was brought to Europe by Arabian merchants in the eighth or ninth century, and Moorish travelers soon encouraged its widespread introduction into the Mediterranean countries in the tenth century. It took another five hundred years for it to reach Northern Europe, but whether the credit is due to the Portuguese or to the Dutch, both of whom traded in the Orient, is difficult to determine.

The first individual to advocate the use of tea in Northern Europe was Cornelius Bottrekoe, a professor in the University of Leyden, who published a treatise on "Tea, Coffee and Chocolate" in 1649. In 1658 an English writer called attention to "that excellent and by all physitians approved, China drink called by the Chineans Tcha, by other nations Tay, sold at the Sultaness Head, a Cophee House by the Royal Exchange, London." By the year 1660, only two years later, its virtues were extolled like a patent medicine of the Victorian period:

"Making the body active and lusty, helping the headache, giddiness and heaviness, removing the difficulty of breathing, clearing the sight, banishing lassitude, strengthening the stomach, causing good appetite and digestion, vanishing heavy dreams, easing the frame, strengthening the memory, and finally preventing consumption, particularly when drank with milk."

What more could one desire?

In this same year of 1660 an excise tax of eightpence was imposed on every gallon of tea made and sold, to be paid by the maker thereof. Later this was supplemented by a tax of five shillings a pound on the leaf, which was complained of as "no small prejudice to the article as well as inconvenience to the drinker."

Of course, Pepys tried tea and recorded his impressions. That goes without saying for that famous diarist did not miss much that was going on in the London of his day. On September 25, 1661, he relates: "I did send for a cup of tea, a China drink, of which I

never drank before." A few years later in 1667 he says: "Home, and there find my wife making of Tea, a drink which Mr. Pelling, the Potticary, says is good for her cold."

To show the esteem in which tea was beginning to be held in England at about this time it is recorded in 1664 that the East India Company deemed a package of two pounds of tea a worthy present for the King. There were those, of course, who tried to stem the rising tide of the popularity of this beverage which had already made quite a record for variant forms of spelling of a three-letter word, for in addition to the forms already mentioned we find it spelled "the" and "tey," and there are probably others also.

One prominent Englishman, Saville, reproved in emphatic language "those who call for tea instead of wine," and stigmatized it as "a base unworthy practice" and lamented that "all nations are getting so wicked as to have these filthy customs." What was the effect of the opposition? Let us refer to the importation figures for two periods, not very widely separated in years. From 1668 to 1674 the total importations of tea of the East India Company into England amounted to less than 500 pounds. In 1720, within less than half a century, the importations amounted to some thousands of pounds annually. Tea had arrived, and it is still with us, and will be even if the Anti-Saloon League puts it on the black list.

Tea played an important part in the development of the American Merchant Marine. Clipper ships were built expressly for the tea trade and during the first half of the nineteenth century the seven seas were dotted with the sails of these incomparable examples of the art of ship building. Tea has won its place as a world's necessity. Progressing from the east to the west it has spread from castle to cottage, and its devotees (as they may be properly called) are now numbered by the billions.

Sairy Gamp drank tea—sometimes. Her preference, however, was for something with more authority and she wanted it when she wanted it. "Don't ask me whether I won't take none or whether I will, but leave the bottle on the chimney piece and let me put my lips to it when I am so dispoged." But she was jealous of her rights, too, for to her friend Betsy Prig, she says "No, Betsy! Drank fair, wotever you do."

We could spend the remaining time allotted to this lecture in telling interesting and surprising things about tea. Do you know that black tea and green tea are not different varieties, but are simply

the result of different methods of preparing and curing the same leaves? Would it surprise you to learn that Orange Pekoe is merely a distinctive name for the leaves that comprise the tender buds at the ends of the shoots or branchlets, and that a single tea plant will furnish a number of grades and kinds of tea which are given different trade names as Congou, Bohea, Young Hyson, and others? These are facts available in any modern reference book, so we shall leave tea and pass to another beverage for a change. But wait—let me call your attention to the fact that I have been talking about tea for ten minutes and have not once referred to it as "the cup that cheers." There is one rarely quoted reference to tea that I would like to leave with you as a final thought: "Tea! Thou soft, thou sober sage, and venerable liquid; thou female tongue-running, smile-soothing, heart-opening, wink-tippling cordial, to whose glorious insipidity I owe the happest moments of my life, let me fall prostrate."

COFFEE AND COFFEE HOUSES

What shall our next venture be? We might as well take up the strongest rival of tea as a table beverage. Whether we spell it coffee, cophee, coava, cobo, café, cauphe, coffa, or any other of the more or less Chaucerian forms in which we meet the word in the early literature, there are millions of individuals, especially in America, who cannot start the day without a cup of this famous decoction, whose early history is involved in almost as much obscurity as that of tea.

We learned a little while ago that tea was responsible for the Declaration of Independence. What responsibility can we fix upon coffee? Well, perhaps nothing quite so spectacular as American Independence, but we cannot mention marine insurance without thinking of the name Lloyds, which was a famous coffee house in the seventeenth century in London, where ship owners and financiers met to arrange for insurance on ships and their cargoes, and both the *Tatler* and the *Spectator,* which marked the advent of modern journalism, had their inspiration in these same coffee houses of eighteenth century London, for when Richard Steele instituted the *Tatler* in 1709 he said in the opening number:

"All accounts of gallantry, pleasure and entertainment shall be under the article of White's Coffee House; poetry under that of Will's Coffee House; learning under the title of Grecian; foreign and domestic news you will have from St. James' Coffee House, and what else I shall on any other subject offer shall be dated from my own apartment."

But we are getting ahead of our story. No reference to the coffee berry or its beverage is found in the records of the Pharaohs, nor did the Mesopotamians mention it, nor their Hebrew contemporaries. The Greeks and the Romans were as ignorant of coffee as they were of tea, in fact, the first authentic references to coffee come through the Arabians from a period some time after the Crusades. Coffee came to us originally from the Ethiopians, who are said to have used it from time immemorial. The Abyssinians, that mys-

The Coffee Plant in Flower and Fruit

terious, dark-skinned Semitic race, were the first civilized people to learn its use, and it was from them that the Arabians obtained knowledge of it somewhere about the twelfth century. The oldest written reference to it is in an Arabian manuscript now in the *Bibliotheque Nationale* of Paris, which dates from the thirteenth century.

Coffee became extensively used in Aden by the fifteenth century "first among lawyers and professional men, then with students and those who learned reading, the custom eventually spreading to artisans and others who worked in the night, and finally by travelers

who journeyed in the night to avoid the heat of the day." It was then held by its users that "This liquor purified the blood by a gentle agitation, dissipated the ill condition of the stomach and aroused the spirits."

It was used by the Mohammedans as a devotional anti-soporific in connection with their prolonged religious services. It soon became a subject for controversy. Coffee was held by the orthodox Mohammedans to be an intoxicating beverage and therefore prohibited by the Koran (please don't tell Mr. Volstead about this), but notwithstanding the threats of divine retribution held out by the ultra-orthodox, the coffee drinking habit spread so rapidly among the Arabians that this beverage is as inseparably connected with Arabia as tea is with China. Its use spread from Aden to Mecca and Medina, thence to Syria and Persia and later to Turkey. Public coffee houses were everywhere established in the near East, affording "a lounge for the idle and a relaxation for the man of business where the politician retailed the news of the State, the poet recited his verses and the Mollahs delivered their sermons to the frequenters."

The Syrian authorities attempted to check and finally to suppress these coffee houses on the alleged ground of "its intoxicating properties," but in reality because these social and political gatherings were incompatible with the strictness and teaching of Mohammedan religion. In Cairo and other eastern cities also there were alternations of edicts forbidding its use and their prompt rescinding when their ineffectiveness was realized.

In Constantinople coffee soon became the favorite drink of all classes, "the coffee houses being thronged night and day, the poorer classes actually begging money in the streets for the sole object of purchasing coffee," and "a refusal to supply a wife with a specific quantity of coffee per diem was admitted to be a valid cause for divorce." Again the ecclesiastical authorities rose in opposition and used their influence wth the Sultan to curb this evil. The Sultan, profiting by the experience in other communities where edicts of suppression had to be rescinded, simply laid a heavy tax on coffee houses, notwithstanding which they continued to flourish and to spread.

The dervishes then played a trump card by claiming that "coffee when roasted became a kind of coal, and that coal was one of the substances which Mahomet had declared was not intended by Allah for human food," and the coffee houses were immediately closed. This prohibition was found absolutely impossible to maintain, and

after a few years pressure enough was brought to bear to change the ruling and the faithful were assured that "roasted coffee was not coal and bore no relation to it." This was in the sixteenth century but many people still believe that the passage of a law or the issuance of an edict would have the effect of changing human nature and human desires.

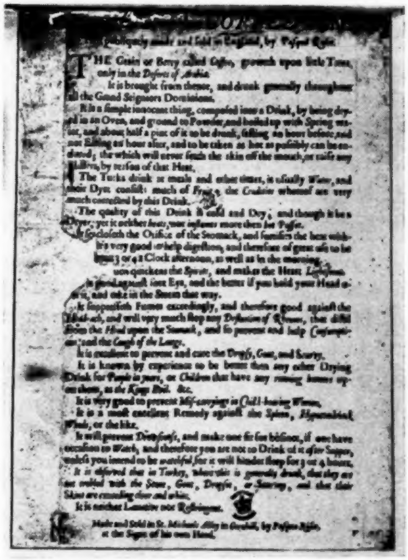
The introduction of coffee into the northern countries of Europe did not take place until the latter part of the seventeenth century, when we find it first referred to by travelers and writers and some of these later actually brought along for trial a few pounds of the precious berries which at first sold for a price equivalent to about twenty dollars a pound. Burton in his *Anatomy of Melancholy* had referred to a "Turkish drink called coffee" in the year 1621, and Bacon in the same year in his *Sylva Sylvarum* referred to coffee as "the drink that comforteth the brain and head and helpeth digestion," but it is not probable that either Burton or Bacon ever tasted coffee.

Pepys does not seem to have paid much attention to coffee. Perhaps his "potticary" did not recommend it for Mrs. Pepys as he did tea, and anyway, Pepys himself was more fond of "sack" than of milder beverages. His rival diarist, Evelyn, however, records the following in his memoirs:

"There came in my time to the college (Oxford) one Nathaniel Canopios out of Greece in the year 1637. He was the first I ever saw drink coffee, which custom came not into England till thirty years after."

The first coffee house in England was not in London, but in Oxford, and was established in 1650 by a Jew named Jacob. Two years later a Greek named Pasque Rossee opened the first coffee house in London in St. Nicholas Alley, Cornhill. Rossee's first advertisement is still in the British Museum and is a simple statement of fact without any special claims for the virtues of the beverage. By 1657 several other coffee houses had been established, and as was true of other places, opposition arose, but the first opposition in England was not from the Church nor from the State. It was from the vintners and brewers who charged them with being "nuisances and a prejudice to the neighborhood." Public opinion, however, as in Arabia and the Near East, welcomed them, and coffee houses spread with great rapidity throughout both England and France. In the latter country they were called cafés, but many a modern café serves other things that are superior to its coffee.

In England coffee was taxed in the liquid state, just as tea was a few years later. Fourpence a gallon was the rate and a penalty of five pounds a month was inflicted upon coffee "speakeasies," when they were detected and apprehended. Even the coffee used for domestic consumption at that time was purchased in beverage form from the coffee houses. The first known newspaper advertisement of coffee in England is found in 1657 and is worth quoting as an example of the wonderful medicinal powers the beverage was credited with possessing.



THE Grain or Berry called *Coffee*, groweth upon little Trees, only in the *Deserts of Arabia*.

It is brought from thence, and drunk generally throughout all the Grand Seigniors Dominions.

It is a simple innocent thing, composed into a Drink, by being dryed in an Oven, and ground to Powder, and boiled up with Spring water, and about half a pint of it to be drunk, fasting an hour before, and not Eating an hour after, and to be taken as hot as possibly can be endured; the which will never fetch the skin off the mouth, or raise any Blisters, by reason of that Heat.

The Turks drink at meals and other times, is usually *Water*, and their Dyet consists much of *Fruit*; the *Crudities* whereof are very much corrected by this Drink.

It is excellent to prevent and cure the *Dropsy*, *Gout*, and *Scurvy*.

It is known by experience to be better then any other Drying Drink for *People in years*, or *Children* that have any *running humors* upon them, as the *Kings Evil*. &c.

It is neither Laxative nor Restringent.

Made and Sold in St. Michaels Alley in Cornhill, by Pasqua Rosee, at the Signe of his own Head.

First English Advertisement of Coffee, 1652

"In Bartholomew Lane, on the back side of the Old Exchange, the drink called coffee, which is a very wholesome and physical drink, having many excellent virtues, closes the orifice of the stomach, fortifies the heart within, helpeth digestion, quickeneth the spirits, maketh the heart lightsome, is good against eyesores, coughs or colds, consumption, headache, dropsie, gout, scurvy, King's evil, and many others, is to be sold in the morning and at three of the clock in the afternoons."

Anybody who advertised coffee with such claims today would be arrested for violation of the Food and Drugs Act. It was Charles II, however, who made himself the biggest fool of the century by

not heeding the experience of those who had tried to suppress coffee in other parts of the world. Coffee houses had increased in numbers and those who patronized them were prone to exchange views on political matters. In 1672 the King "having been informed of the inconveniences arising from the great number of persons that resort to coffee houses, desired the lord keepers and the judges to give their opinions in writing, how far he might lawfully proceed against them." The report was rendered that "Retailing coffee *might* be an innocent trade, but as it is used at present, in the nature of a common assembly to discourse of matters of state, news and great persons, as they are nurseries of idleness and pragmaticalness, they *might* be thought common nuisances."

PROHIBITION AND COFFEE

The question was seriously debated for three years by the King and his lords and in 1675, on the 23d of December, King Charles II issued a "Proclamation for the Suppression of Coffee Houses." This is worth repeating in full:

"Charles R.

"Whereas it is most apparent that the multitude of coffee houses of late years set up and kept within this Kingdom, the Dominion of Wales and the town of Berwick-upon-Tweed, and the great resort of idle and disaffected persons to them have produced very evil and dangerous effects, as well for that many tradesmen and others do herein mis-spend much of their time which might and probably would be employed in and about their lawful calling and affairs, but also for that in such houses divers, false, malicious and scandalous reports are devised and spread abroad to the defamation of His Majestie's Government and to the disturbance of the peace and quiet of the realm, His Majesty hath thought fit and necessary that the said coffee houses be (for the future) put down and suppressed and doth strictly charge and command all manner of persons, that they or any of them do not presume from and after the tenth day of January next ensuing, to keep any public coffee house, or to utter or sell by retail, in his, or her, or their houses or houses (to be spent or consumed within the same) and any coffee, chocolate, sherbett or tea as they will answer the contrary at their utmost peril.

"Given under our court at Whitehall this third and twentieth day of December, 1675, in the seven and twentieth year of our reign.

"God save the King."

Just think, after reigning as monarch of England for twenty-seven years Charles II knew so little about his job and his people that he thought he could get away with an edict like that. Well he couldn't and he didn't. Before January 10th arrived the clamor was so great and the protests so numerous that an extension of time was given in the following amendment:

"Out of princely consideration and royal compassion all and every of the retailers of the liquor aforesaid shall be allowed to keep open till the four and twentieth day of June next."

And this extension of time was simply for the purpose of saving the King's face, for no enforcement was ever attempted and the subject never came up again. This is a fine kind of a "blue law" to have lying around on the statute books unrepealed, isn't it?

As has been previously mentioned Steele gave credit to the coffee houses of the early eighteenth century for the material to be used in the *Tatler,* and later when Joseph Addison started the *Spectator* as the *Tatler's* successor, he too announced his intention of frequenting the coffee houses for news. Pope was familiar with coffee houses and is the author of that oft repeated quotation

> "Coffee! Which makes the politician wise,
> And see through all things with half closed eyes."

LLOYD'S AND COFFEE

The great Lloyd's Insurance Company had its origin, as has been stated, in a seventeenth century coffee house. Mr. Edward Lloyd had some time prior to 1688 established a coffee house in Tower Street, which in 1692 he removed to Lombard Street, London, which was the resort of all who were directly connected with shipping. Indeed, a weekly paper was issued in 1696 which was called *Lloyd's News,* and which was devoted to shipping intelligence. Later, *Lloyd's News* was replaced by *Lloyd's Post* and in 1774 the coffee house ceased to be a proprietary establishment and moved to the Royal Exchange under the name "New Lloyd's Coffee House," and became a co-operative organization resembling a club, with subscribing members and a general manager.

In France, the cafés as the coffee houses were called, became the mecca for people of fashion, artists, litterateurs and statesmen. Tea and chocolate were also served in these establishments, which remained on a higher plane as regards patronage than was the case in England. There was some mild opposition, but nothing official. Madame Se-

vigne placed herself upon record as saying that "coffee and other poisons would soon go out of fashion."

There had been some opposition in Italy in the sixteenth century on the part of certain fanatical priests who denounced coffee as an invention of Satan. They claimed that the evil one having forbidden his followers, the infidel Moslems, the use of wine, no doubt because it was sanctified by Christ and used in the Holy Communion, had given them as a substitute this hellish black brew of his which they called coffee. For Christians to drink it was to risk falling into a trap set by Satan for their souls. It is further related that the Pope, made curious, desired to inspect this devil's drink and had some brought to him. The aroma of it was so pleasant and inviting that the Pope was tempted to try a cupful. After drinking it, he exclaimed, "Why, this Satan's drink is so delicious that it would be a pity to let the infidels have exclusive use of it. We shall fool Satan by baptizing it and making it a truly Christian beverage."

If we credit this story, which is taken from a work called *All About Coffee* by Ukers, we have in coffee the only beverage which is a member of the Church.

In Ardennes, it is said, custom decrees the serving of ten separate cups of coffee after a formal dinner, and each one of these is given a specal name. The guests at such a banquet must feel like adopting the famous motto of the Pinkerton Detective Agency—"We never sleep."

CORTEZ AND COCOA

We might as well complete the triple alliance while we are about it, the third member being chocolate, for in most of the coffee houses of England and France, chocolate was usually served as well as coffee and tea. We know more about the introduction of chocolate to the civilized world than we have been able to learn concerning tea and coffee for the past history of chocolate is linked with the name of one of Spain's most cruel conquerors—the famous Cortez. Chocolate was originally a Mexican product and was first brought to Europe by Cortez in 1528 with a number of other interesting and novel products of the new world.

Chocolate is the paste produced by grinding the seeds of a large gourd-like fruit which grows on a tree. The seeds are improperly called beans, and are entirely devoid of the characteristic chocolate flavor until after they are roasted. The tree had undoubtedly been

under cultivation in Mexico for many centuries and the seeds, or nibs, as they are also sometimes called, were not only accepted as revenue or tribute in Mexico, but were also used in lieu of currency. One of the early Christian fathers commented upon this fact very pointedly for he referred to it as "blessed money, which exempts its possessors from avarice, since it cannot long be hoarded or hidden underground."

Cortez found chocolate the national drink of Mexico, used by rich and poor alike, particularly because of its nutritive qualities. Montezuma, the Emperor, had his chocolate prepared in the form of a thick froth, delicately flavored with vanilla and spices and sweetened with sugar or honey. The Emperor's chocolate was prepared in golden utensils and served in golden goblets and with golden or carved tortoiseshell spoons. The poorer subjects contented themselves with a less expensive beverage prepared with water and without spices or sugar.

It was the sole beverage of royalty in Mexico and no less than two thousand pitchers of the drink were prepared for the royal household, the King himself consuming fifty per day. The tree and its fruit were held in such high esteem that there were special ceremonies attendant upon the planting of the seed, and these were accompanied by a sacrifice of blood, that of a dog usually sufficing.

The Spaniards kept secret the source and method of preparing chocolate for nearly a century, during which time they encouraged its widespread use and profited by the monopoly. So well was this secret kept that during the war between Spain and Holland, although the Dutch frequently captured Spanish vessels containing shipments of raw cocoa beans, they did not recognize their identity or know their use and threw them overboard as of no value. This was probably due to the fact previously mentioned that the raw nibs are entirely without the characteristic flavor which is developed by the roasting process to which they are subjected before being ground.

In 1606 an Italian named Carletti discovered the secret and introduced the method of roasting and preparing chocolate first into his own country and later into France during the reign of Louis XIII. In a few years the use of chocolate had spread throughout Europe. There was no organized or unorganized opposition to the use of it as there had been in the cases of tea and coffee. The only criticism

on record seems to have come from a writer named Franciscus Rausch, who in 1624 published a book upon the subject in Vienna in which he urged the abolition of its use by monks, in whom it was alleged to provoke improper thoughts and desires. This belief seems to have been rather widespread and to have lasted for nearly a century, for in 1712 Addison says in the *Spectator*: "I shall advise my fair readers to be in a particular manner careful how they meddle with romances, chocolate, novels, and the like inflamers, which I look upon as very dangerous to be made use of during this great carnival."

Old Illustration Showing the Drinking of Coffee, Tea and Chocolate

In 1659 in France the manufacture and sale of chocolate was given as a monopoly to David Challon for a long period of years, but in 1693 the monopoly was abridged and all confectioners and grocers (who then included the apothecaries) were permitted to sell it.

The Mexican word for chocolate is *chocolatl*. The plant was called cacao by the Spaniards, and cacao it would have remained to this day as a popular term had it not been for the error of one of the transcribers who aided Dr. Johnson with his first English diction-

ary, and the word appeared as cocoa. This has caused endless confusion ever since, for the word cocoa is often wrongly associated with the coconut, which furnishes another edible product and also a fixed oil, and these are both confused with coca, a South American drug which yields the habit forming alkaloid cocaine.

Linnaeus, the great Swedish botanist, gave the plant its Latin name of *Theobroma,* which literally means "the food of the gods." Perhaps Linnaeus had heard the Mexican legend of the origin of chocolate, which was said to be the fruit of a tree enjoyed by the gods in an Eden-like sanctuary in Mexican tradition and given as a gift to mankind by Quetzelcoatl, one of the famous Mexican deities, who had also taught mankind many useful arts and who was reverenced highly by the natives.

We do not often employ the real chocolate as a beverage today. We substitute for it what we erroneously call "cocoa," which is made by expressing chocolate to separate a portion of the fat. This fat is called cocoa butter and is used in medicine. The residue, after expressing the fat, is called "cocoa" and has practically all the flavor of the chocolate, but is more easily tolerated by the stomach of the average user than the richer beverage produced from chocolate itself. Chocolate and cocoa more frequently appear in foods and confections than in beverage form, although the latter use is rapidly increasing.

THE UNIVERSALITY OF STIMULANTS

Before leaving the interesting triumvirate of non-intoxicating beverages let us give a little philosophical consideration to the very obvious fact that man seems to need a stimulant. Tea and coffee contain caffeine, chocolate contains theobromine, both of which principles are stimulating, and the three plants yielding these beverages are entirely unrelated botanically, and originated in parts of the world each entirely remote from the other and were discovered by peoples who were in very primitive states of civilization. To add still further to this interesting field of speculation, there are three additional beverage-producing substances, all containing caffeine, which have been used by the aborigines of three different continents for their stimulating qualities. These are kola of Africa, maté or Paraguay tea of South America, and Cassina of our own southern United States in North America. This is more than a coincidence and is worthy of especial research in itself, as proof of the fact that even aboriginal man always craves stimulation

and invariably finds the right product to produce the desired effect. This basic fact may have an important bearing upon sociological and political questions. The influence of these various stimulants upon particular eras of intellectual and social development would be an interesting field of research too. We do not generally realize that the Shakespearean and Elizabethan periods depended entirely upon wine for stimulation. Tea, coffee, and chocolate did not come into use until after Elizabeth, Shakespeare and Ben Jonson had all passed away.

ANTIQUITY OF BREWING

And now let us leave the respectable drinks for a short time and discuss one that is at present under the ban of the eighteenth amendment. The dictionary says that the word "beer" is of uncertain origin and that is the way the prohibition administrators feel about the product, so there is dissatisfaction all around. The reputed inventor of beer is usually referred to as Gambrinus. No such thing. Gambrinus is a corruption of Jan Primus or Jan I, a Flemish ruler who reigned over the province of Brabant in the latter part of the thirteenth century, and who was president of the Guild of Brewers and whose portrait was painted with a foaming tankard of ale in his hand. He had a good press agent.

Beer is much older than that. The word in biblical place names means a well, so that Beersheba, which everybody remembers as being some distance from Dan, has nothing to do with either beer or Sheba, for this particular name means "the well of the lions." Another case of misbranding under the Food and Drugs Act. Just like "near beer," for whoever was responsible for that name was a poor judge of distance. Ceres is said to have taught mankind the art of making beer when she was wandering over the earth in quest of her daughter.

Beer was known to the Egyptians, if we use the word in the generic sense, for the term was originally applied to a fermented decoction of cereals and still is used in connection with beverages of miscellaneous origins, as ginger beer, root beer, etc. The bitter, hop-containing beer was probably of Teutonic origin and was mentioned in connection with the tribes of Northern Europe by both Greek and Roman writers. Beer, porter, stout, and ale are all closely related products, differing in body, color, flavor, and alcoholic content. Ale and beer were at one time synonymous terms; as used at present the names describe quite different products. The word

"ale" originally meant a kind of feast or merry making, and we still use the root in connection with our word "bridal," which was originally the "bride-ale" or wedding feast. Of course this usage was derived from the fact that ale was the chief item of refreshment served at these gatherings.

They had church ales and college ales, too, in early England. The acknowledged purpose was to draw a lot of people together to collect money for the institution sponsoring such a festival. The people brought the food and the church wardens or college trustees furnished the ale—at a profit. In confirmation of this widespread practice a church at Norfolk bears the following inscription carved on its wall:

"God speed the plow
And give us good ale enow,
Be merry and glade
With good ale this work was made."

The word "potation" was used during the Elizabethan period to denote an annual entertainment (with beer as the principal feature) which was given by schoolmasters to their pupils, and an old statute of this period gives us a new insight into the relaxations of sixteenth century students and teachers. "The said schoolmaster shall and may have, use and take the profits of all such cockfights and potations as are commonly used in schools." Beer was so important an article in early England that they had official beer tasters, *gustatores cerevisiae,* who are responsible for the maintenance of the quality of the beverage.

Colleges usually brewed their own ale. The ales of Brasenose and Magdalen Colleges at Oxford were especially famous for their quality. The Chancellor's ale was of unusual strength and was used only at high table for guests who had taken especial honors. Two wineglassfuls are said to be a maximum allotment for safety's sake. On special occasions the Dean will grant an order for a pint, the largest quantity ever allowed. Here is a poem inspired by one of Brasenose celebrations:

"Shall all our singing now be o'er,
Since Christmas carols fail?
No! let us shout one stanza more
In praise of Brasenose ale.
A fig for Horace and his juice,
Falernian and Massic;

Far better drink can we produce,
Though 'tis not quite so classic.
Not all the liquors Rome e'er had
Can beat our matchless beer;
Apicius' self had gone stark mad
To taste such noble cheer."

Another Oxford author gives this ingenious theory of the evolution of malt and hop liquors:

"A grand cross of 'Malta' one night at a ball
Fell in love with and married Hoppetta the tall.
Hoppetta, the bitterest, best of her sex,
By whom she had issue the first Double X.
Three others were born by this marriage—a girl
Transparent as amber and precious as pearl;
Then a son twice as strong as a 'porter' or scout,
And another as 'spruce' as his brother was 'stout.'
Double X, like his sister, is brilliant and clear;
Like his mother, is bitter, by no means severe;
Like his father, not 'small,' and resembling each brother,
Joins the spirit of one to the strength of the other."

CARBONADE?

And now let us turn our attention to "carbonade." What? You do not know what carbonade is? Perhaps you know what soda water is? Perhaps you know also that the term "soda water" is a misnomer, and that it contains no soda. Well, along about fifty years ago when soda water was in its infancy, some purist wanted to change the name, and as soda water is simply water impregnated with carbon dioxide, or carbonated water, he suggested the euphonious and perfectly appropriate name of "carbonade," and a contemporary writer, along about 1882, said "the term will probably be universally adopted in a few years." Another argument against making prophecies as to what will or will not become popular.

Well, to give the story of carbonade we must go back several hundred years and delve into the romance of chemistry for a few minutes. You know the ancients had conveniently agreed that there were but four elements—earth, air, fire and water. It was very simple and was so easy to learn. Along about the seventeenth century appeared an alchemist named J. B. Van Helmont, who was from Missouri so far as this "air" business was concerned. His experiments led to the discovery of a new kind of "air" which he found naturally occurring

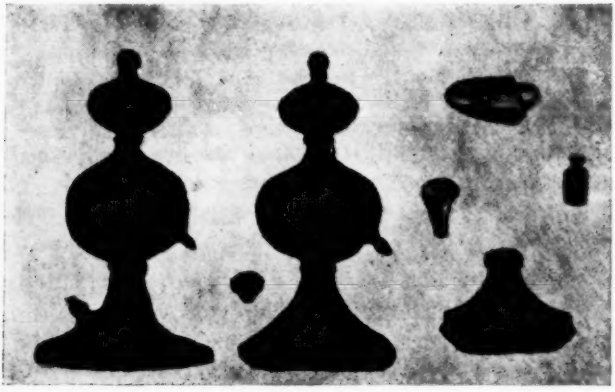
in certain caverns, in the waters of effervescing mineral springs, and in the exhalations of decaying vegetation. He also found that he could produce this same kind of "air" by burning charcoal, by burning alcohol, by the action of acids on marble, limestone or oyster shells, and in the fermentation of wine or of beer. In consequence of these various sources he called it *"gas sylvestre,"* which, when literally translated means "the gas that is wild and untamed," like Kipling's cat that walked alone.

But wait—Van Helmont did more than this. He invented the word "gas." No one had ever seen or used or heard of the word before. Van Helmont literally pulled it out of the "air." He says of this invisible substance: "This spirit hitherto unknown, I call by the new name gas." Here then is one of the few words in the English language that has no family tree, no etymological history. Like Topsy, it "just growed." Van Helmont overlooked the very important fact that carbon dioxide is a small but ever present constituent of atmospheric air, but that is another story.

About one hundred and fifty years after Van Helmont's time, another chemist named Black reinvestigated this same gas and gave it a new name. He called it "fixed air." He did not approve of Van Helmont's work and wouldn't use the name gas. At about this time there was a famous grotto near Naples that was called the *Grotto del Cane* or Dog's Cavern, the air of which contained carbon dioxide in large amounts, and which was exploited for the delectation of visitors and the profit of the proprietors by throwing a dog into the cave attached to a rope. After the dog had become unconscious from asphyxiation he was hauled out and resuscitated, to the surprise and admiration of the spectators. The S. P. C. A. had no local branch in Naples, it is unnecessary to say.

In about 1750 a French chemist named Venel laid before the French Academy of Sciences a plan for duplicating Seltzer water which he had experimentally accomplished by mixing *sal aeratus* (literally, the "aerating salt," which was used at that time as leavening agent in culinary practice) with "marine acid," later called hydrochloric acid, with a certain proportion of water in a closed vessel. This product he called "aerated water," and when carefully made, with no excess of either of the original ingredients remaining unchanged, it closely resembled the natural Seltzer water, which is slightly saline and effervescent.

A few years later Dr. Joseph Priestley, the discoverer of oxygen, experimented with the exhalations of the brewery vats in Leeds, which was at that time his home. Can you picture this sedate clergyman leaning over the edge of a brewery vat pouring water briskly back and forth between two glass vessels in order that it might become impregnated with the gas and acquire the characteristic which we know as "sparkling," which is a phenomenon of effervescence or the liberation of a dissolved gas. Priestley claimed that by this procedure it was possible with ordinary water to communicate the peculiar spirit and virtues of "Pyrmont water," a natural spring water somewhat resembling Seltzer in its properties, but being less saline.



Early Portable Generator for Mineral Water or "Seltzer"

There were others who worked on this same subject and contributed to the facts which had been accumulating, and the time was about ripe for a commercial application of these principles, so we find that in 1790 an individual in Geneva named Nicholas Paul commenced the commercial manufacture of carbonated waters or "aerated waters" as they were then called. The practice soon became popular and spread rapidly.

The earliest record of soda water in America is in a Philadelphia pharmacy, the store of Townsend Speakman on Market Street near Second. Mr. Speakman, who was an ancestor of Professor Joseph P. Remington, for many years Dean of the Philadelphia College of Pharmacy and Science, was a pharmacist whose store was frequently visited by Dr. Philip Syng Physick, a famous Philadelphia physician

of a little over a century ago. Dr. Physick had been interested in Priestley's experiments upon carbonated water, and although Dr. Priestley had been dead for several years, Dr. Physick induced Speakman to prepare carbonated water for his patients in 1807. The first soda water served by a pharmacist in America, therefore, was served on a physician's prescription, and it is said that the addition of a fruit syrup to make the drink more palatable to the patient was the suggestion of pharmacist Speakman.

If a physician today wrote a prescription for *Aqua Acidi Carbonici,* for such was the Latin name of soda water in several of the pharmacopoeias of a century ago, he might have trouble in having it filled, for the pharmacist who could translate the prescription would not likely have a soda fountain. And wouldn't Van Helmont, Black, and Priestley be astonished to see a piece of "dry ice" or "carbice," as the solidified form of carbon dioxide is called, which is now coming into use for emergency refrigerating purposes?

And here we are, nearly at the end of the time allotted to our talk, and we have mentioned only a few of the more important of what may properly be called beverages. We have paid no attention to whisky or to brandy, which are spirituous liquors obtained by distillation. Brandy, literally *brannt wein* (burned wine), was the first spirituous liquor made in this way and was called *aqua vitae, eau de vie,* and other names indicating the esteem in which it was held. Indeed, Raymond Lully said of it is the thirteenth century: "The taste of it exceedeth all other tastes and the smell of it exceedeth all other smells."

These and other alcoholic spirits such as rum and gin (which derives its name from Geneva, which in turn is derived from Juniper which gives the characteristic flavor to this liquor) were often made in the household. The still room was almost as important as the kitchen or pantry and all of the medieval recipe books contained detailed directions for making many beverages and medicinal preparations by distillation, which was then a household art the same as weaving and dyeing.

All nations seem to have their own preferences and types of liquors of the more ardent varieties and so we meet sake, arrack, vodka, pulque, etc. The liqueurs, or cordials as they are usually called, are sweetened and diluted spirits and are of many flavors. They originated in the monasteries and genuine Benedictine and Chartreuse are still made under the supervision and control of the members of

these respective orders. There was a ribald drinking song of medieval times which, on account of its ecclesiastical flavor was supposed to have originated in a monastery. It ran like this:

"Come then, wench, and kiss us
Dum vivum potamus.
To Bacchus and Illisus
Te Deum Laudamus."

We do not have time to discuss fancy drinks or mixed drinks, for the list of these alone, if complete, would take another hour to call the roll. We may know what is meant by a cocktail or an aperitiv, and may have heard of and tasted egg-nog, but when it comes to a swizzle, a sangaree, a sling, a smash, or a sour, we may have to plead ignorance. Some of these, like the sherbet, the tisane, the shrub, and the vinegar, are non-alcoholic. We learn with surprise that "whiz" is another name for buttermilk, that "bever" is a sweet, aqueous liquid made by expressing the residue from cider or from grape juice after adding water to it. *Potus Imperialis* (Imperial Drink) sounds noble until we learn that it is made from cream of tartar, water and sugar, and then we lose interest in it. We are surprised to know that the "peg" of the Englishman in tropical India is so named because each one is supposed to be a peg in the coffin of the drinker thereof.

So many of these special drinks have interesting histories associated with their names. For instance, there is the "contradiction." You put a little whisky in to make it strong, then a little water to make it weak, a little lemon to make it sour and a little sugar to make it sweet, and finally, you pick it up and say "Here's to you," and drink it yourself.

I fear we shall have to take refuge finally in "Nepenthes," that famous potion which would assuage all grief and bring forgetfulness of sorrow, of which Milton sang when he said:

"Not that Nepenthes which the wife of Thone
In Egypt, gave to Jove-born Helena
Is of such power to stir up joy as this."

I am sure that none of you have developed a "Katzenjammer," the kind that inspired Eugene Field to write that memorable poem, of which one of the couplets runs:

"How gracious those dews of solace that over my senses fall
At the chink of the ice in the pitcher the boy brings up the hall."

Let us take our wee "Doch and Doris" or "Stirrup Cup" and part in friendliness. So beginning with the drinking salutation of the Caesars and coming gradually down to date:

Bene vos, bene nos, bene me, bene te,
Bene nostrum etiam.
or
Bene mihi, bene nobis, bene amicae nostrae.
or
Prosit.
or
Wass-hael
or
Gesundheit
or
Saluté
or
"Here's a health to you and all your family and may the skin of a gooseberry be big enough to make an umbrella to cover all your enemies."

YEAST EXTRACT, A NEW AND SATISFACTORY PILL MASS EXCIPIENT

By Wolfgang Schnellbach, Dr. phil. Bernensis

THE FACT, THAT PILLS made by old-fashioned methods usually become hard and indigestible on standing, was one of the causes of their almost complete displacement by tablets which are expected to readily distintegrate in the stomach. In Europe, where pills are still extensively used, an effort has been made to overcome this defect by the discovery of a better pill excipient. Professor Dr. Heinz (Erlangen, Germany) has suggested for this purpose the dried and powered beer-yeast and also yeast extract which is an extract of yeast albumins. Both of these substances are efficient excipients equal to or better than older and well-known substances and in addition have a therapeutic advantage. The dry cells of yeast

absorb water and swell, making the pills readily absorbable by the stomach. They also stimulate gastric secretions.

The extensive experiments of the pharmacologist Dr. Grönberg (Finland) showed that such fillers and excipients as glycyrrhiza, magnesia, wax, woolfat, mucilage of acacia, etc., were not suitable for the making of therapeutically useful pills but that very satisfactory results were obtained when dry yeast extract was used. These results were confirmed by the experiments of Sabalitschka, Eschenbrenner, Hofmann and Bedal.

Based upon this recommendation the revision committee of the German Pharmacopœia introduced this product into the new edition (Ph. G. VI).

The Ph. G. recognizes two kinds of medicinal yeast. The "Faex medicinalis" which is dried at a low temperature and still retains the ability to ferment and a second form called "Extractum Faecis." This is a mixture of yeast extract and medicinal yeast which is dried at a temperature high enough to destroy the activity of the yeast cells. Only the latter is used as an excipient for pills.

Beside the mentioned mixture of dry yeast extract and medicinal yeast which are official there are also two other preparations of yeast on the market in Germany which are recommended and frequently used by pharmacists as excipients for the preparation of pills. These are a highly concentrated yeast extract, the so-called "Extractum Faecis Spissum" and a dry powdered yeast extract. The "Extractum Faecis Spissum" is especially useful to combine a relatively large amount of dry powders for the preparation of pills, while the dried powdered yeast extract has about the same character as the official "Extractum Faecis," which is a mixture of dried powdered yeast extract and medicinal yeast, as already mentioned.

For the use of these yeast preparations as an excipient or filler for pills the followed suggestions are offered: If there is only a small portion of ingredients to be combined the dry yeast extract or the official preparation "Extractum Faecis" with sufficient of a mixture of equal parts of water and glycerin will be satisfactory. If there is a large amount of dry powders to be amassed it is recommended that the "Extractum Faecis Spissum" be used, unless some other vegetable extract is present

Powdered digitalis leaves and quinine hydrochloride are ingredients which are especially difficult to form into a mass. Very often they are prescribed in an amount which does not permit the addition of much massing material without making the size prohibitive. It has been found that ten per cent. of the official extract of yeast is sufficient to form these into a very satisfactory pill mass.

In pill preparations calling for large amounts of liquid constituents such as volatile oils, balsams, creosote, etc., dry yeast extract or the official yeast extract also yielded good results.

Pills which are made with "Extractum Faecis Ph. G." or a medicinal yeast which has been dried at 100 degrees C., will occasionally puff considerably, becoming hollow inside. This appearance is not due to fermentation as the yeast cells have been destroyed by heat. To prevent the puffing of the pills a minimum amount of the water-glycerin mixture should be used.

The two official preparations "Faex Medicinalis" and "Extractum Faecis" also the "Extractum Spissum" are manufactured by the "Chemische Fabrik Zyma, Erlangen, Germany." This firm sells the official "Extractum Faecis" under their trade name "Cenomasse" followed by the statement "Gebrauchsfertige Pillenmasse," pill excipient ready for use.

Extractum Faecis—Yeast Extract

Yeast extract is prepared from bottom beer yeast, freshly taken from fermenting tubes. This yeast is at first washed frequently with water in a decanting vessel at a cool temperature, then sifted through a sieve having openings of approximately 0.15 millimeter diameter and deprived of bitterness by treatment with a one per cent. solution of sodium carbonate. Finally it is washed until the wash water no longer shows an alkaline reaction to litmus paper and is clear and colorless. The adhering water is then removed from this purified yeast as far as possible by pressure, a low pressure at the start which is gradually increased.

Twenty parts of this yeast are mixed with ten parts of water and one part of hydrochloric acid and the mixture allowed to autoferment for twelve hours at 40 to 50 degrees C. The product is then heated for a short time on a water bath and the liquid removed by

straining. The residue is again heated with ten parts of water on a water bath and the liquid removed by straining. The combined liquids are now filtered and concentrated under vacuum to a thin extract, and this extract mixed with twenty-five times its weight of medicinal yeast which has previously been dried for two hours in a drying oven at 100 degrees C. The mixture is finally heated to dryness under vacuum.

Yeast extract is a brown powder having a spicy taste; its solution in water is turbid.

Yeast extract should not be black-brown in color nor have a bitter or an empyreumatic taste.

Faex Medicinalis—Medicinal Yeast

Medicinal Yeast is bottom beer-yeast which is washed, deprived of bitterness, dried at a temperature of at least 40 degrees C. and reduced to a moderately fine powder.

Medicinal Yeast is a light brown powder having a characteristic odor and taste. Previously moistened litmus paper is turned slightly red by this yeast.

Medicinal Yeast consist of single, round or egg-shaped cells of from 0.008 to 0.01 mm. in diameter.

Medicinal Yeast should not have a disagreeable taste or odor or be putrid.

With iodine (T. S.) Medicinal Yeast shows only occasional blue-black colored particles (*starch*). No crystals should appear when observed in alcohol (*sugar*). An active fermentation should result when 0.1 gm. of Medicinal Yeast is mixed with a sterilized solution of 1 gm. of honey in 19 cc. of water (*dead yeast cells*).

Medicinal Yeast for Pills

For the preparation of pills only a medicinal yeast is permitted which has been heated for two hours at 100 degrees C. in a drying oven.

One-tenth gm. of Medicinal Yeast for the preparation of pills should not cause fermentation when mixed with a sterilized solution of 1 gm. of honey in 19 cc. of water (*living yeast cells*).

"PHARMACY CONSCIOUS"*

I look upon the teachers and the editors as men of outstanding influence. It is their privilege to mould and guide the thoughts and actions of the followers of Pharmacy.

Editorial influence has encouraged wholesome legislation. It has supported pharmaceutical education. Our journals have promoted sound business method. In former days the journal was one of the primary sources from which the apprentice turned for education, and toward which the proprietor looked for guidance in the practice of his art.

Hand in hand with journalism stands the College of Pharmacy in its work of guiding youth to become pharmacists. Interlocking with both are the associations. Each is complementary to the other. The advancement of pharmacy must come from the united efforts of these agencies.

Looking over the position of the drug stores of our land at the present day one is struck with the fact that in many respects they lack the elemental features of our conception of a drug store. They may sell drugs and medicines, put up prescriptions and carry on the business of a drug store, but they do not look the part. We may sometimes wonder whether this changed atmosphere in the drug store has not caused a loss of confidence on the part of patrons, giving to the store a lower caste.

An outward survey of the ordinary drug store of today reveals a heterogeneous array of merchandise gathered from many lines of trade lacking in specific features or character. It is a shapeless, formless mixture of merchandise. It is neither a stationery store, a notion shop, a grocery, an ice cream parlor or a restaurant. Nothing stands out by which it can be recognized or remembered. As one speaker expressed it "The Drug Store of today is not Pharmacy Conscious."

A western druggist modernized his store by moving the old-time shelf ware, show globes and other old-fashioned stuff to the garret, and found that his family trade and prescription trade fell off.

*Abstract of remarks by Dr. Fred B. Kilmer at a lunch held at the Drug and Chemical Club, New York City, December 19, 1928.

He restored enough of them to give his store a drug store appearance, and the lost trade came back.

A store in the Middle West has built up a large and exceptionally profitable trade in prescriptions, sick room supplies, drugs and kindred wares. In his store the atmosphere of pharmacy predominates. He employs seven registered men. He stated that he had a good sale on imported perfumes at $25 per bottle. He sold beauty lotions at $12 per package. His cheapest hair brushes were $4. He sold no tooth brushes for less than $1 each. He said his patrons knew that they were trading in a high-grade pharmacy where they would get the best of everything, and were willing to pay for it.

Visiting the store of an old-time acquaintance I noticed that he was making his prescription department prominent. I was curious, he informed me, that really there was no prescription trade in his town—that the doctors all dispensed their own medicines; but, he added "I find that when I advertise prescription I can get a better price for a lead pencil."

A druggist in one of our large cities tied his store up with a dairy. The milk is produced and bottled under systems which he supervises and certifies. He gets a royalty of five cents a quart and the sales exceed five hundred quarts per day.

If a druggist must go into the food business, why not give it a pharmaceutical twist and charge for it?

In modern medicine, the diet therapy has assumed far greater importance than drug therapy.

If a druggist is in the lunch trade, why not specialize in furnishing diets according to the prescriptions of the attending physician?

Few homes or restaurants are prepared to prepare the diets called for in modern practice. There is a strong demand from patients who are not confined to the hospital for a place where they can secure the prescribed diet. The druggist above all others can fill the need.

Hygiene and public health is a subject now being stressed by writers and speakers. We find in this millions of new customers for the drug store. Its application runs through the whole realm of Pharmacy. There is home hygiene—the care of the family. The avoidance of sickness, the keep well, keep fit doctrine—these make for the sale of drug store stuff. Soaps, skin lotions, toilet wares,

tooth brushes, shampoos, antiseptics, disinfectants and a multiude of wares which belong to Pharmacy.

In the drug store of the present-day business is paramount. The druggist must increase volume of sales and profits or go broke. The drug journals fill their pages with schemes for increasing sales of soda water, sandwiches, cigars, candy, stationery, knick-knacks and sundries of all sorts. This, of course, appeals to the reader who, above all else, wants to increase his sales and profits.

Slowly advancing in the drug field we have glimpses of Ethical Pharmacy, prescription stores, stores where the atmosphere is that of Pharmacy. Can we not give to every store an atmosphere of Pharmacy, a pharmaceutical halo? Can we not put drugs back into the drug store without disturbing the trade in the thousand and one items now sold. Can we not add Pharmacy in such a way that every customer who enters the door will know that they are in a drug store. It may take time and heroic effort, but I believe it can be done.

I am not an editor, but roughly I have thought that it might be helpful if our journals were to inaugurate a department which shall carry a series of well-worked out articles; showing in detail and with conciseness how to increase trade and profits in commodities which are pharmaceutical in character.

The following occur as suggestive subjects:

Pharmaceutical Preparations.
Household and Emergency Medicines.
Hygiene and the Public Health.
Serums.
Disinfectants.
Insecticides.
The Prescription Trade.
Physician's Supplies.
Sick-room Supplies.
Maternity Supplies.
Infant and Invalid Foods.
Articles pertaining to modern therapeutic diet.
First Aid Supplies.
Surgical Dressings.
Ligatures and Sutures.
Physio-Therapy appliances—(Light and heat rays, etc.).
Home Hygiene.
"Keep well" Supplies.

Many other subjects could be added.

My plan contemplates that our journals shall add to their already established features a series of articles of this character, possibly by special writers, illustrated and built along specific, concise and well-wrought plans, telling the reader just how to carry on the work.

Such articles may well cover methods of store display, counter display, departmentizing. The open prescription department might be exploited. Methods of circularizing and other forms of advertising should be given.

The idea is to inject into the modern drug store an atmosphere of Pharmacy; to add to the business of the present-day drug store an increased business in items now neglected; to make the druggist Pharmacy conscious. In my judgment, a well-worked out plan of this character will increase the interest of the readers of the journal. It may be made to increase the subscription list, and possibly increase the advertising patronage.

I am aware that articles of this character have appeared in our pharmaceutical journals. My idea is to do this systematically, repeatedly, and continue it as one of the features of pharmaceutical journalism.

I would have this reinforced through our Colleges of Pharmacy. Some of these colleges now carry business courses. The idea is to have them emphasize the business side of Pharmacy: to teach the student how to make money in the pharmaceutical side of his calling.

To these two forces, the pharmaceutical journals and the colleges, there might be added that of the pharmaceutical associations, where, at the meetings, papers, talks and demonstrations might be given, showing the druggist how he can make money by following pharmacy.

To put it briefly, the idea is to inaugurate a continuous campaign, a First Aid Week and a Pharmacy Week, which will be continuing possibly for several years: a campaign which tends to show the druggist a way through which he can superimpose a profitable business in lines applied to Pharmacy upon the trade which already comes to his store.

ABSTRACTED AND REPRINTED ARTICLES

RECENT RESEARCH ON THE VITAMIN*†

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IN HIS LECTURE to this Society two years ago, Mr. F. H. Carr gave a comprehensive survey of the state of knowledge of the vitamins at that time, and indicated the methods by which such knowledge had been gained. Since then definite progress has been made, not only on the lines already followed, but also on fresh lines of thought which have already produced much exact information about several of the vitamins, and which promise still more accurate work in the future.

Vitamin D

Vitamin D, the antirachitic factor, is the one of which we have the most precise information. Even this one has not yet been obtained in a pure form, though we now know what is its precursor; that is, we know the substance which, on irradiation with waves of certain lengths, will give a certain amount of vitamin D. The history of this discovery is particularly interesting. Several investigators had satisfied themselves that a substance called cholesterol, itself without antirachitic properties, became endowed with such on exposure to the rays from a quartz mercury vapour lamp. Only a few facts were known about the structure of the cholesterol molecule, and investigators were particularly keen to discover what exactly was the molecular change that was brought about on irradiation and that converted a substance without antirachitic activity into one which had this property. This led to the examination of many of the known compounds of cholesterol. If a compound with a slightly different formula from that of cholestrol was found to be non-activatable on irradiation, then it was considered direct evidence that the part of

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the cholesterol molecule, wrapped up and put out of action, as it were, in this compound, was the part which was concerned in the change from the non-antirachitic to the antirachitic character.

Rosenheim and Webster (1926) investigated cholesteryl chloride, $C_{27}H_{45}Cl$, cholestene, $C_{27}H_{46}$, cholestenone, $C_{27}H_{44}O$, the ketone of cholesterol, cholesteryl acetate, cholesteryl palmitate, and coprosterol the sterol of fæces. They also examined various other sterols, such as ergosterol, $C_{27}H_{46}O$, higher alcohols, such as α-amyrol, $C_{30}H_{50}O$, hydrocarbons such as squalene, $C_{30}H_{50}$, and the bile acids, cholalic and desoxycholic acids, possessing the same ring system as cholesterol. Of all of these, only the two cholesteryl esters (acetate and palmitate) and ergosterol proved to be capable of activation. From these results, the investigators concluded that only the protoplasmic sterols can be activated, that the excretory sterols cannot be activated, and that both the secondary alcohol group and the unsaturated carbon linkage in the sterol molecule must be intact for activation. About six months later the same workers were able to announce that they could recover unchanged at least 99.9 per cent. of the cholesterol after activation, and that they obtained maximum activity whether they irradiated the cholesterol for about thirty minutes or for a few hours. Further, Windaus had found that if they prepared the tetrabromide of another sterol called stigmasterol, itself activatable, carefully purified it, and recovered the stigmasterol and tried to activate that, it could not be done. These considerations led them to assume that it was not cholesterol itself that could be turned into the antirachitic factor by irradiation; it was some impurity in that product. They therefore prepared the dibromide of cholesterol which itself had been purified by many recrystallisations, and had been shown to be activatable. This was purified and then reconverted into cholesterol and the product irradiated. It was not activated. Hence it was concluded that it was not cholesterol itself, but some impurity in it which assumed antirachitic properties on irradiation.

The Identification of the Provitamin

Schultz and Morse (1925) had indeed suggested that specimens of so-called "pure" cholesterol might not always be so. They based this idea on their results of spectrographic examination of various specimens. Windaus showed that cholesterol, purified as described above by the preparation of its dibromide, did not give the absorp-

tion spectrum usually considered characteristic of cholesterol. Heilbron, Kamm, and Morton (1927) correlated the activatability of a specimen of cholesterol with this spectrum. When the specimen did not give this spectrum, then it could not be activated antirachitically. At this stage in the investigation Dr. Rosenheim and Professor Windaus collaborated and came to the conclusion that the provitamin was indeed a sterol of an unsaturated and labile type of which ergosterol is the only known representative. Ergosterol itself was found to have the same absorption spectrum as the cholesterol which could be activated, the intensity of the spectrum being enormously increased. Judging by the intensity of the spectrum, the amount of ergosterol in ordinarily pure cholesterol is about one part in 2000. Rosenheim and Webster (1927) show that a daily dose of 1/10,000 mgm. of irradiated ergosterol cures and prevents rickets in rats given a rachitogenic diet, which figure is in general agreement with the amount of cholesterol, containing one part ergosterol per 2000 as an impurity, which is required for a similar cure.

Moreover, it was further observed by Morton, Heilbron, and Kamm (1927) that as the irradiation of the ergosterol or impure cholesterol proceeded, the characteristic bands of ergosterol, 293.5, 281.55, 270$\mu\mu$, diminished in intensity and a new band at 247$\mu\mu$ gradually developed, but, after remaining stationary in intensity for some hours, this also disappeared. With its disappearance departed also the antirachitic activity of the product. Hence it was concluded that the band 247$\mu\mu$ is characteristic of vitamin D or of some substance formed concurrently with vitamin D.

Conditions and Effects of Irradiation

Rosenheim and Webster (1928) then announced that vitamin D was not precipitated by digitonin, which made it possible to remove unchanged ergosterol from an irradiated sample of it. By this means, they were able to show that during the early stages of irradiation of ergosterol the amount of vitamin D slowly increases, but a stage is reached at which formation and destruction go on at the same rate, so that for some hours the amount of vitamin D in a sample of ergosterol remains constant during its irradiation, then a stage comes when all the ergosterol has been converted into vitamin D, most of which has been destroyed. Continued irradiation completes the destruction of vitamin D, and the preparation is without antirachitic

activity. The maximum amount of vitamin D present when a solution is irradiated at room temperature is about 10 per cent. But Bills and Brickwedde (1928) have shown that this proportion can be increased by irradiation at the temperature of liquid oxygen (—183° C.), a fact which indicates that the change is an isomerisation and not an oxidation.

This work naturally suggested the advisability of irradiating ergosterol with rays of particular wave-lengths only, and not with the whole range which comes from a mercury vapour lamp, some of which obviously have a destructive effect. Vitaglass cuts off rays below 260$\mu\mu$, and would therefore apparently be useful in letting through the needed rays and cutting off the destructive ones, so that irradiation through this should have resulted in increased formation of vitamin D in a given time. Webster and Bourdillon (1928) have found that this does not happen, and from further careful experiments they are inclined to believe that rays of wave-length 280$\mu\mu$, rather than 247$\mu\mu$, are destructive of vitamin D, which makes the problem of selective radiation more difficult still.

Meanwhile, Steenbock and Daniels in America had been investigating this reaction in a slightly different way. Before the absorption spectrum of cholesterol or of ergosterol had been examined they were irradiating cholesterol with monochromatic light and determining which rays were the effective ones in generating vitamin D. Realising the minute amounts of irradiated cholesterol required to show a deposition of calcium in the bones of rachitic rats, it occurred to them that their "line" test could be used for many photochemical investigations. Thus, Fosbinder, Daniels, and Steenbock (1928), selecting the wave length 265$\mu\mu$ and measuring the energy transmitted from it in a given time through their apparatus to a "pure" specimen of cholesterol, determined the minimum time required to produce a positive effect in their well-known "line" test for the antirachitic factor. It proved to be 22.5 seconds. The energy absorbed during this time was 234 ergs. The number of quanta absorbed was calculated as 3.2×10^{13}. Applying Einstein's law of photochemistry, this would imply that 3.2×10^{13} molecules of vitamin D had been synthesised during the exposure of 22.5 seconds. The number of gram molecules is then 5×10^{-11}, and assuming the molecular weight of the antirachitic material to be essentially the brium between cholesterol and the precursor of vitamin D generated in this experiment was $5 \times 10^{-11} \times 385 = 2 \times 10^{-8}$ Gm. The American workers then

prophesied that when pure vitamin D was obtainable, this would be found to be approximately the amount required to give a positive result in their "line" test. A result obtained in the early days of work on vitamin D in this laboratory shows this to have been a singularly acurate prophecy. By means of the technique learnt by ten months' work in Professor Steenbock's laboratory, the Society's standard preparation of irradiated ergosterol was shown to give what Professor Steenbock would have classified as a positive result in the line test in a daily dose of 0.00002 mgm., which is equal to a total ten days' dose of 0.0002 mgm., that is, 2×10^{-7} Gm. Assuming from Rosenheim and Webster's work the presence of only 10 per cent. of vitamin D in this, the dose becomes 2×10^{-8} Gm. of vitamin D, which is an extraordinarily clear confirmation of the American workers' prophecy. It was evident also that the line test would even measure smaller amounts of vitamin D than this. (Coward, 1928.)

A later paper from the same laboratories by Kon, Daniels, and Steenbock (1928) shows that the amount of energy for this transformation of ergosterol into vitamin D is constant for the rays of wave length 256, 265, 280, and 293$\mu\mu$ respectively; that is, "the formation of vitamin D from ergosterol is thus shown to be independent of the wave length over practically the whole range of selective absorption and to be only a function of the incident energy."

There are other workers who still contend that ergosterol is not the only precursor of vitamin D. (Bills, Honeywell, and MacNair, 1928.) Their results, however, do not seem to make it entirely beyond doubt that they had removed all traces of ergosterol from their cholesterol, and the question will apparently have to be broached from a different point. Jendrassik and Kenényffi (1927) assume an equilibrium between cholesterol and the precursor of vitamin D.

Hypervitaminosis

The work on vitamin D so far reported emphasises the smallness of the dose necessary for antirachitic action. The influence of unduly large doses of this factor has lately been exercising the minds of scientists and clinicians alike. The fact that the administration of vitamin D causes an increase in the blood calcium has led people to wonder whether excessive dosage with this factor might be the cause of the calcium deposits sometimes found in the kidneys, and of the condition known as arteriosclerosis, etc. Experiments have

been begun on rats, but the matter is complicated by different investigators having irradiated their ergosterol in different solvents, and some at least of the harmful effects observed may be attributed to the toxic products formed by the action of ultraviolet rays on the solvents used. It is also possible that the ill-effects may be due to the degeneration products of vitamin D, formed by excessive irradiation. Until these possibilities have been fully investigated, no decisive statement on the point can be made. It is, however, reassuring that the dose of irradiated ergosterol deemed necessary for bringing about these ill-effects is of the order of 100,000 times the amount necessary for curing really florid rickets. It is impossible that anyone taking vitamin D in the form of cod liver oil would ever run the risk of such an over-dose, and no one would dream of taking the more concentrated forms available except under a doctor's orders.

It may be remarked at this stage that urinary calculi have been found in the kidneys of rats deficient in vitamin A by van Leersum (1928) and in the bladders of similar rats by Osborne and Mendel, 1917.

There is no colour test known to be specific for vitamin D.

Vitamin A

During their work on the spectroscopic examination of provitamin D and vitamin D itself, it was natural that Morton and Heilbron should consider the spectroscopic examination of cod liver oil as a means of detecting the presence of vitamin A in it. Vitamin A is destroying by exposure to light, and might therefore be expected to show selective absorption. One or two workers had detected in cod-liver oil an absorption band in the region of 320-328 $\mu\mu$, but had not associated it with vitamin A. Morton and Heilbron (1928) then examined various samples of cod liver oil known from biological tests to vary widely in their content of vitamin A, and by measuring the intensity of the absorption band at 328 $\mu\mu$ found it to run exactly parallel with the depth of colour produced by the arsenic chloride (or antimony trichloride) colour test. Similar correspondence was found in the case of highly concentrated forms of vitamin A, such as the unsaponifiable fraction of cod liver oil, and further support for the hypothesis that the chromogenic substance was the one giving the absorption band at 328 $\mu\mu$ was obtained in the examination of the fat from sheep's liver and from "essogen," a commer-

cial preparation rich in vitamin A. Moreover, on blowing oxygen through cod liver oil, the "colour" test and the absorption band disappear at the same rate. Hence, if the colour test can be established beyond all doubt as a measure of the vitamin A activity of a sample of cod liver oil, the assay of that factor in cod liver oil will no longer require a period of eight or ten weeks demanded by the biological test. It is only fair to say here that, although the colour test has not yet been proved to be specific for vitamin A, all the evidence so far obtained indicates that it is. The assay of vitamin A in other products will in time be possible by this means also, but the method for extracting the vitamin A, even from a substance such as butter, is by no means perfect yet, and until it is, biological tests for this factor in such substances will still have to be carried out.

The absorption spectrum of the colour produced in this test has been determined by Rosenheim and Drummond (1925), and confirmed in a very careful piece of work by Wokes (1928). With arsenic trichloride, bands at about 587 and 475 $\mu\mu$ respectively were obtained. With antimony trichloride, bands at about 614 and 530 $\mu\mu$ respectively were obtained.

A few weeks ago Professor Mellanby (1928) recorded some valuable experiments on what he called the anti-infective property of vitamin A. He showed that if vitamin A alone were lacking from a diet, rats fell a prey to many infectious diseases. It confirms the work of Wolbach and Howe, who showed that in the absence of vitamin A the epithelial linings of all parts of the body show degeneration and become an easy prey to invading organisms. As Mellanby's work was published in the *British Medical Journal* the public was soon made cognisant of it through the daily press, and various hysterical headlines concerning the dethronement of vitamin D appeared, together with pious demands that scientists would make up their minds as to which vitamin was the most necessary for the well-being of the community. Actually there are two papers in the literature by Eichholz and Kreitmar (1928) and by Grant, Suyenaga and Stegeman (1927) respectively, in which they record a definite decrease of resistance as a result of vitamin D deficiency. It is easily conceivable that in the absence of any one vitamin, the animal's powers of resistance may be lowered, and scientists never will claim that any one vitamin is of greater value than the rest, for each one has its specific uses, and probably many more than are at present suspected.

Vitamin B

It is just about two years since various workers on vitamin B began to obtain definite information on the dual nature of vitamin B, that what had always been considered one substance was, in fact, two. Hassan and Drummond (1927), in an attempt to discover what it was that counteracted the ill-effects of high protein diets, discovered that not only yeast itself could do this, a fact which had been demonstrated by various workers already, but also that yeast autoclaved in an alkaline medium could do it. This treatment was known to inactivate the factor generally known as vitamin B, that is, the factor that can cure polyneuritis in pigeons. Seidell (1926) found that autoclaved yeast increased the growth-promoting power of his extract of the antineuritic factor. Chick and Roscoe (1927) added further evidence on the dual nature of vitamin B, and it is now generally accepted that what used to be called vitamin B really consists of at least two factors. These have been named temporarily B, and B_2 by the Accessory Food Factors Committee of Great Britain. Unfortunately, America has almost generally adopted the letters F and G for these two factors, but not all of the vitamin workers over there are of one mind about it, for some of them would prefer to keep the letter B for the antineuritic factor and adopt a different one, F or G, for our B_2. Goldberger (1926), in a brilliant investigation of the disease, pellagra, discovered first of all that it was a deficiency disease, and later that it could be cured by eating dried yeast. There is a certain amount of evidence that the factor in the dried yeast responsible for the cure is our B_2 (the Americans' G). The work on the dual nature of vitamin B has indicated that both B_1 and B_2 are necessary for growth, and this has led to an attempt to assay each one in the presence of large excess of the other by its influence on the growth of rats.

A somewhat startling result of these experiments, however, is being encountered by many workers. Several people have found that even after giving what they think must be enough B_1 and B_2, yet normal growth has not been established in the rats. Hunt (1928), on this evidence, has postulated the existence of a third member of the B complex, but as he had not apparently standardised either his B_1 (by its action on polyneuritic pigeons), or his B_2 preparations, it seems at least possible that his failure to obtain normal growth is due to a quantitative deficiency of B_1 or B_2 or both, rather than to a

lack of an unidentified factor different from both of them. Until it has been shown that a very large excess of both B_1 and B_2 will not bring about normal growth, it is unnecessary to postulate the existence of a third factor.

Marrian, Baker, Drummond, and Woollard (1927), in work on the physiological rôle of vitamin B made a most interesting observation. They could get the retraction of the neck of pigeons, characteristic of vitamin B deficiency, in animals which were receiving abundant supplies of vitamin B in the form of marmite, but which were otherwise receiving no food at all. Hence the influence of vitamin B on the retracted neck symptoms cannot be a direct one, but must be an indirect one, somehow, through the food consumed.

An important contribution to our knowledge of the two factors has lately been made by Levene (1928). When they were first definitely distinguished from each other, Levene examined his vitamin B concentrate and found it to be richer in B_1 than in B_2. He further found that silica gel has the power of adsorbing both factors, but it adsorbs B_2 preferentially. Thus dried yeast contains B_1 and B_2 in the proportion of 1 : 7.5, and the material obtained from the silica gel contains them in the proportion of 1 : 30. Thus a fraction containing very much more B_2 than B_1 can be obtained, and also a residue containing both. He also found that B_2 could be deaminised by the action of nitrous acid, whereas B_1 is unaffected by this treatment. Hence it is possible to obtain a fraction containing only B_1 by deaminising the original preparation that contained both.

Vitamin C

Very little work has been done on vitamin C recently. Zilva (1927) has shown that in his fractionation he gets maximum precipitation of vitamin C at *p*H7, when neutral lead acetate is used rather than basic lead acetate which he used in his original method. Later in the same year he showed that the reducing action noticed previously in the purest of his antiscorbutic fractions was not due to the antiscorbutic factor itself, as had at first seemed not unreasonable to suppose. Zilva and Hoyle (1927) also showed that their most active fractions contain iron, phosphorus, and sulphur, but no manganese. Those present behave on dialysis like the active principle.

Rumours are current in France that vitamin C may shortly be shown to consist of two factors, one antiscorbutic and the other

growth-promoting. If this really is so, it will form a most interesting distinction between the needs of the human being who is said to require both vitamins C, and the rat who has always been regarded as not requiring either.

Vitamin E

A full account of Professor Evans's work on vitamin E is published in the memoir by Evans and Burr (1927). It is a fat soluble vitamin, occurring in most natural foodstuffs, and in particularly high concentration in lettuce and wheat germ. It is a constituent of the unsaponifiable matter of wheat-germ oil, is not destroyed by acetylation, is heat stable, and, in strong contrast to vitamin A, is not easily oxidised. It seems to be primarily associated with reproduction. The degeneration of the testes brought about by a continued lack of it in the diet in the male is irrecoverable. In the female, it seems to be necessary for some process during gestation after the fœtus has been implanted, for in the lack of it the fœtus is absorbed. Curiously enough, recovery from this shortage seems to be possible even in the most advanced stages. Fortunately vitamin E, being fat soluble, is stored in the animal body, so that a temporary shortage would have no more effect than such a shortage of the other fat soluble vitamins. Evans's latest work shows that this vitamin also is growth-promoting. Thus all the vitamins (except perhaps vitamin C for certain species of animals) have been shown to be necessary for growth. It has not, however, been shown that any of them have a direct connection with the phenomenon of growth. It may well be that the animal only grows when other functions in its body are proceeding normally.

The Work of the Pharmacological Laboratories of the Society

The department was established primarily for the assay of vitamins A and D in cod liver oil, but its work has been greatly extended in other directions. Manufacturers of foodstuffs now no longer have any excuse for making false claims for their products. Instead of assuming the presence of vitamins in their foods, they can now obtain exact information on the subject. They have, in fact, taken great advantage of this possibility, and a very great deal of useful information has been gained, not only of the vitamin content of the products

submitted for examination, but of the ordinary food substances, available to the general public, which have been tested simultaneously for the sake of comparison.

The first object of the department has, however, been the improvement of existing methods of assay. A real advance in this direction has been the adoption of a preparation of irradiated ergosterol supplied by Mr. T. A. Webster, of the National Institute for Medical Research, as a standard with which to compare the vitamin D potency of other substances. This was done with the approval of the Accessory Food Factors Committee, and after nearly two years of work with it the Medical Research Council has decided to prepare large quantities of similar potency for distribution to other laboratories of the world in order to see how far it may be possible to adopt it as the international standard.

A preparation of unsaponifiable matter of cod-liver oil is also under experiment, to see how far it may be possible to adopt such a preparation as an international standard of vitamin A. This, is, however, a more difficult matter in view of the fact that vitamin A is easily oxidised on exposure to air. It has been shown lately by Huston (1928) that a trace of hydroquinone in the preparation renders it much more stable, and this makes the problem more hopeful. Other work is being carried out on a large scale to try to settle whether the "colour" test is really specific for vitamin A. That is, tests are being carried out on large numbers of rats, both here and at University College, to see how far biological results are (*a*) concordant with themselves, and (*b*) concordant with the colour reaction of the oil concerned. If, as mentioned earlier in this paper, this correlation could be definitely established, the biological test for vitamin A in cod-liver oil could be discarded, and for the vitamin A assay of other substances a standard preparation of cod-liver oil, or of its unsaponifiable matter, of a particular colour index could be issued. The biological result obtained in any laboratory by a given dose of such a preparation could then be used for comparisons and assays in any other laboratory and with any other technique.

How far the Medical Research Council will concern itself with standard preparations for the other vitamins is doubtful. So far no very acute symptoms of deficiency of vitamins B, C, and E have been evident in this country, and the slighter symptoms, such as lack of

energy, headaches, constipation (with its more serious consequences), can so easily be cured by intelligent feeding that it seems much more a matter for the housekeeper or the individual himself than for a body such as the Medical Research Council or the Pharmaceutical Society.

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GOLD LEAF—OLD AND NEW*

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Four thousand years ago the Egyptians hammered gold in much the same way that it is beaten today, except that they did not produce nearly so thin a leaf. Their mummy cases, and in some instances the mummies, were profusely gilt. The gold of Egypt was mined, and it is recorded that, in the time of Rameses II, upwards of $35,000,000 worth was the annual yield.

"The temple of Solomon was marvelously gilt"—and in one of his works Pliny mentions that "in my home a single ounce of gold admits of being beaten out into 750 leaves four fingers in length by the same in breadth." Thus it is seen that the beating of gold is by no means a modern art. However, it is fair to presume that the gold leaf of the ancients was of far different character from the tenuous product of this day. The instruments wherewith these artisans worked could not have been nearly so delicate as the tools used by the modern workman in that field. While the Parisian makers in 1621 extended one ounce of gold to cover 105 square feet, the present advanced state of the art extends one ounce to cover 200 square feet, or enough to cover the floor of the average sized living-room.

So that the reader may have a picture of the processes involved in manufacturing gold leaf, the following information, culled from a booklet, issued by Hastings and Company, pioneer American manufacturers of this product, is submitted as being interesting and accurate.

The starting point in gold leaf manufacture is gold bars from the U. S. Mint, 999.9 fine—alloyed with silver and copper, according to the shade desired, the highest grade and standard color being known as XX, or extra deep. This represents a product 23 carats fine.

A long narrow bar 12 x 1 x 1½ inches is cast and rolled into a thin ribbon about 525 feet long. After cutting this into one-inch squares, the gold beater takes 150 pieces of the gold, which are interleaved with as many parchment paper leaves (imported from Europe) four inches square, forming a packet called the "cutch." All

*Reprinted from *Bulletin, Wagner Free Institute of Science*, 1928, 3, 59.

packets are held together with parchment bands. The cutch is beaten for twenty minutes with a heavy hammer on a smooth marble block until the gold has thinned and extended to the edges. It is then taken from the cutch and each piece is quartered; the 150 pieces have thus become 600 pieces, and these are interleaved with 600 pieces of gold-beater's skin, forming a packet called the "shoder," which is four and one-half inches square.

The gold-beater's skin mentioned is made from a very delicate membrane lining the intestines of the ox, the preparation of these skins being almost wholly in the hands of one firm in London that supplies the demand of every country where gold leaf is produced.

Another beating then takes place, more careful, more delicate and more precise than the former, until the gold has expanded as far as the shoder will admit. This second beating takes about two hours. Each piece is again quartered, the 600 pieces becoming 2,400 pieces. These are again interleaved with gold-beater's skin and form three packets, each containing 800 pieces, called the "mould," which is 5¼ inches square. The leaf is now so thin and delicate that much greater care and thought must be used. Even a change in the weather may now affect it, so the beater has to use all his knowledge to keep it from breaking up or going into holes. This third beating takes four or five hours.

How the workman manages to beat all the pieces equally and yet beat none into holes he alone can answer. It is one of the mysteries of the craft. The finished leaf of gold is about 1/280000 of an inch in thickness, or, to state it more clearly, five dollars in gold is beaten to cover 6,000 square inches.

The cutters then trim the uneven edges from the leaves with a sharpened reed set in a tool named a "wagon." Twenty-five gold leaves are placed in a book of tissue paper, the leaves of which have been covered with rouge to prevent the thin leaves of gold adhering to the paper. This finishes the process. So delicate is the work of cutting, in the process of which the breath is used more than the touch, that only about 80 per cent. of the beaten leaves are available for putting in the books, the trimmings being remelted.

So thin are the finished leaves that over a quarter million of them, piled one over the other, will occupy a space somewhat short of an inch.

The Control Laboratory of the John B. Stetson Company recently undertook a survey of gold leaf supplied to the high-class hat

trade for stamping the dies or trade-marks on hat leathers. That of American manufacture was vastly superior, from the standpoint of uniformity of color and texture, to the products of foreign origin. From the latter source there has recently come a leaf manufactured by a secret process and said to be available to the trade at a price less than that of the domestic hand and machine worked article.

Practical tests were made with the "new" foreign leaf and were not satisfactory. Uneven texture and color and silver spots occurred with its use. Photomicrographs were taken of the leaf, which clearly demonstrated its nature. The reproductions shown herewith indicate the fibrous nature of the hand-beaten product and the crystalline structure of the foreign leaf. The inference is, of course, that the

AMERICAN LEAF. × 800

FOREIGN LEAF. × 800*

latter is an electrolytically deposited leaf. This, no doubt, accounts for the uneven distribution of the gold and the baser metals in the leaf, and the unsatisfactory results obtained with the practical tests.

The following data are from the files of the Research Laboraties of the John B. Stetson Company and are indicative of the character of the leaf called for by the hat trade. The assays are done in the standard way—the gold by cupellation, the silver by acid solution, etc., and it has been clearly demonstrated that such assays can be conducted with an average error of less than 1/10 of 1 per cent. All weighings are made with the completely dried product (leaf dried by chemical desiccation).

*Microphotographs by P. P. Ramanuskas.

Weights given in "grams." Measurements given in "inches."

	A	B	C	D
Sheet size (average)	$3\frac{29}{32} \times 5\frac{3}{32}$	$3\frac{7}{8} \times 3\frac{3}{8}$	$3\frac{3}{8} \times 4\frac{1}{2}$	variable
Weight of book	.4645	.4718	.4155	.3892
Number of sheets	25	25	25	25
Average wt. per sheet	.01858	.01887	.01662	
Average wt. per sq. inch	.00093	.00144	.00109	.001199
Fine gold	765	791	759	834
Fine silver	210	190	218	74
Base metals	25	19	23	92
Number of sheets to inch	301,360	194,631	257,128	252,000

A is the product of an American concern, favorably known to the trade. This firm, by scientific control, delivers a very uniform product, with leaf beaten thin, to the very limit of its "beatability," and the gold content always held to its accurate minimum. It is to be noted that an over-thin leaf has poor covering quality and frequently requires a second leaf to hide its deficiencies. This is not an economical procedure, and practical experience proves the value of a leaf, unpatched, and having a thickness over 1/280000 of an inch.

B is the product of an American concern using older methods of manufacture and control. This firm is unwittingly generous with its gold, but supplies a very substantial leaf.

C is an American product of fairly uniform quality—with no more gold than is demanded, but with a leaf of good texture.

D is the foreign electrolytic product, not satisfactory to the trade. Note the high gold content. This deviation, of course, causes a difference in color compared to the standard product.

The method of calculating thickness of gold leaf is appended herewith, and while it may not be scientifically exact, it has been found quite reliable in practice.

1 cubic inch of water weighs 16.39 gm.

1 cubic inch of gold leaf alloy weighs 280.269 gm.

This figure is obtained after ascertaining the specific gravity of the alloy, used in 760 fine gold. (760 parts per 1000.) This is 17.10. Then 16.39×17.10 equals 280.269 gm.

1 square inch of leaf weighs .00103 gm.

Thickness of each leaf is its cubic content divided by its square content.

Proportionally stated 280.27: .00103 :: 1 cu. inch : x.

$x = .000003675$ cu. inch (in one square inch of gold leaf).

Therefore its thickness in inches is—

.000003675 ÷ 1 × 1 or 1

or .000003675 of a linear inch.

To make a pile of leaf an inch thick it will require 272,109 sheets or leaves (each .000003675 in. thick).

This calculation may be simplified for practical application by accepting this premise.

If the alloy is approximately 760 parts fine gold, a leaf which will weigh 1 mgm. per sq. inch will require for an inch thickness as many sheets as there are milligrams in each cubic inch of the gold.

Thus if the gold calculates a cubic inch weight of 280,269 gm., and a square inch of its beaten leaf weighs exactly .001 gm. or 1 mgm., there will be exactly 280,269 leaves to the inch. From this we generalize the following theorem:

Number of leaves to the inch = X
Weight of one cubic inch of the gold in milligrams = Y
Weight of one square inch of the leaf in milligrams = Z
Then: X = Y ÷ Z

CORRESPONDENCE

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1-6-29

American Journal of Pharmacy
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Gentlemen:

In an editorial of December, 1928, entitled "Aberglaube und Hexerei," Professor Charles H. LaWall summed up very pointedly that the supposed mental maturity of mankind is nothing but "mental mush."

But who, may I ask, is responsible for the prevailing superstitions of our age if not the educators themselves? Speaking frankly, our schools, colleges and college professors are largely responsible for the gross ignorance and prevailing superstitions of our day.

Schools and colleges teach the boys and girls "facts" and "truths" based upon facts. But what are facts and what are truths? Do any of the boys and girls know that? Can any of them define such words in common use as facts, truths, falsehoods? If they cannot define these terms; if they don't know the difference between a scientific fact and a falsehood, how on earth can they help being superstitious and credulous?

Years ago we have defined a fact as anything that can be observed, measured and demonstrated to be in accord with the well-known laws of nature. We have defined—truth—as statements of facts, and falsehoods we have defined as honest beliefs not based upon facts, or else based upon facts that will not stand critical analysis, such as hearsay tales and exaggerated stories of saints, miracles and the supernatural in general.

Where are the schools and colleges that teach the boys and girls the meaning of facts and falsehoods? The truth is that everything supernatural is a superstition pure and simple. But to admit that requires great moral courage, and to apply this to actual life would mean to place a large sign over the portals of every church—*"Aberglaube und Hexerei."*

So we must conclude that the mental maturity of mankind is still far, far off. There is some consolation, however, in the development of mankind and that it is moving forward steadily and slowly, so slow in fact, that we can hardly notice it. But then, as Doctor Frank Crane says, "Even fleas are getting bigger and better . . . " So there is hope.

Very truly yours

A. W. LEVER.

B. W.

P. S. We would consider it a favor if you would return this manuscript if, for one reason or another, you are unable to publish it.

A. W. L.

MEDICAL AND PHARMACEUTICAL NOTES

PROHIBITION BUREAU PLACES RESTRICTION ON WINE TONICS, BITTERS, HORKE-VINOS AND SIMILAR PRODUCTS. (*From our Washington Representative*)—The Prohibition Bureau has issued a sweeping regulation limiting to legitimate drug channels the sale of such alcoholic medicinal products as wine tonics, bitters, fernets, vermouths, horke-vinos, ferro-chinas and advocaats, whether imported or manufactured domestically, and whether made with a wine or spirit base. Large quantities of these products, manufactured more or less in accordance with the approved formulas requiring their adequate medication, have been sold through delicatessen shops, soft drink establishments, etc., and in the opinion of the prohibition officials have been diverted to beverage use. The Bureau plans to shut off this illegitimate traffic. The regulation is as follows:

TO PROHIBITION ADMINISTRATORS AND OTHERS CONCERNED:

On and after January 1, 1929, alcoholic medicinal products such as wine tonics, bitters, fernets, vermouths. horke-vinos, ferro-chinas and advocaats whether imported or manufactured domestically, with either wine or spirit base, must be sold for bona fide medicinal purposes only, through retail drug stores, drug departments of department stores, and general stores in which drugs, patent medicines or pharmaceuticals are customarily sold. Each domestic manufacturer, or importer, whose products are affected by the above classification must submit as a part of his application to manufacture, or import, a sworn statement that his product, or products, will be sold only in and distributed from the places above indicated. In the event of doubt as to the classification of any of such preparations, the question shall at once be referred to the Bureau for decision.

The labels used on alcoholic medicinal products, the advertising matter, and all circulars and special literature which are distributed in connection therewith, shall make no reference to the wine or spirits used in the products, except that the percentage of alcohol contained in the article should be stated where state and federal laws so require. The dosage and method of administration should be clearly stated on the labels attached to

the containers in which the products are sold. All alcoholic products affected by this circular letter which are manufactured, or imported, subsequent to January 1, 1929, should bear across the principal label a statement as to the date of manufacture, or importation.

The sale of all stocks of the preparations referred to herein manufactured prior to January 1, 1929, which are in the possession of dealers not mentioned above on said date, may be continued until April 1, 1929.

J. M. DORAN,
Commissioner.

The Bureau desires it understood that no action will be taken against legitimate dealers who may have on hand after April 1 preparations manufactured prior to January 1. It will be a matter of interest to the officials, however, to note the labels of such goods as it will enable them to identify roughly the date of their production.

The Bureau has already found it necessary to provide an amendment to the above regulation to take care of private formula preparations. In the course of a few days a supplemental regulation will be issued exempting from the operation of the above ruling manufacturers of private formula preparations intended for the use of physicians, dentists and veterinarians. Such preparations will be permitted to be sold direct and need not pass through the hands of drug jobbers or retailers.—*N. W. D. A. Bulletin.*

THE USE OF CHLORINE IN WATER PURIFICATION—The disinfection of water supplies by chlorine now occupies a definite position among the standard methods of purifying water. During the last five years, noteworthy improvements have been made in chlorinators by the manufacturers with the result that new types have been developed and many of the delicate parts of the first types eliminated. These improvements have lengthened the life of chlorinators and eliminated many of the "troubles" of the operator.

In Central and South America, as well as in other countries located at a considerable distance from the points of production of liquid chlorine, it appears that "electrolytic chlorination" of water supplies is a logical development. By this term is meant the pro-

duction of chlorine by the electrolysis of common salt and the provision of suitable apparatus for its application to a water supply. The high cost of chlorine in the interior cities of these countries, together with the uncertainties and delays in the transportation of liquid chlorine from the chemical works in foreign countries, combines to favor the installation of small electrolytic combines.

The most important unit of the apparatus is the electrolytic cell, and unless the proper cell is selected it is a waste of time and money for a water works or a municipality to adopt electrolytic chlorination. The only other requirement to insure the success of this method is that electric current must be available which is not subject to frequent and lengthy interruptions. This difficulty may be taken care of by the installation of a small generating unit for emergency use; or a chlorinator may be provided for emergency use and a few cylinders of liquid chlorine carried on hand. *Jour. Amer. Med. Assoc.*, 92: 6.

Disinfection of Instruments—According to L. Gabbano ("Zeitschrift für Hygiene und Infektions-krankheiten," September, 1928), aqueous-alcoholic solutions of chlorine compounds of methane, ethane, and ethylene have a powerful disinfectant action which is more pronounced than ethyl alcohol either pure or as methylated spirit. The strongest are tetrachlorethane and tetrachlorethylene, while chloroform, on the contrary, is very much weaker. Di- and trichlorethylene used for technological purposes have, in concentration of 10-20 volumes per cent., a disinfectant action and can replace tetrachlorethane, which is unsuited as its vapour is poisonous. For the disinfection of barbers' materials the author recommends a solution made up as follows:

Technical trichlorethylene	20 parts
Methylated spirit	70 parts
Water	10 parts

The solution is useful for the sterilisation of dental instruments and other apparatus used in minor surgical operations as well as for the hands and skin. Trichlorethylene is recommended on account of its cleansing and disinfecting action. Its vapour is harmless, and it is a common chemical of industry used as a fat solvent. It is adapted

for disinfecting brushes, combs and razors, as it does not damage the bristles and has no corrosive action on metals in the presence of water. It is without unpleasant smell, cheap, volatile, and the odour soon vanishes from disinfected surfaces. The solution recommended can be diluted 150 c.c. to a litre of water without separation. The finish or varnish of brush handles will be dissolved, but other organic solvents have this disadvantage. Results of tests on bristles infected with *B. coli, B. subtilis,* and *Staphylococcus* are given. The author compares the results of the action in 70 per cent. alcohol of dichlormethane, chloroform, tetrachlormethane, ethylenedichloride, ethylidenedichloride, tetrachlorethane, pentachlorethane, dichlorethylene, tetrachlorethylene, ethyl alcohol, and phenol in varying concentrations on *B. coli, Staphylococcus, B. diphtheriæ, V. choleræ, Achorion Schönleini, Tricoph. violaceum.* The action of tetrachlorethane, trichlorethylene, dichlorethylene on *Staphylococcus, B. coli, Achorion, Trichorphyton* has also been studied.—*Chem. and Drugg.*

THE NATURE OF PEPSIN*—The interest that was manifest a generation ago in the therapeutic use of preparations of the digestive ferments or enzymes has largely been dissipated. This is primarily due to the circumstance that the utility or need for the internal administration of such products has become problematic. The investigations of the Council on Pharmacy and Chemistry of the American Medical Association in recent years have indicated that digestive enzymes are no longer widely prescribed and that physicians who employ them confine their use almost wholly to cases of demonstrated or believed enzyme deficiency. This, however, does not alter the fact that digestive ferments are of significance in the physiologic processes of alimentation and command attention from the standpoint of their function. For years the question of the chemical nature and physical properties of enzymes has been vigorously debated. They have not been isolated in a state of purity and at best it has been possible to describe them as "nondiffusible colloid particles." Some writers quote Willstätter's suggestion that "a molecule of an enzyme consists of a colloidal carrier and a purely active group." It

*Reprinted from *Jour. Med. Assoc.* 91:90 (Jan.) 1929.

is even possible, Bodansky adds, that enzymatic activity is not due to any single molecule but rather to several relatively simple chemical compounds constituting a system.[1] Such discussions are at best confessions of ignorance. Most of the efforts to "purify" enzymes have resulted in the separation of products bearing the characteristics of proteins. This has been conspicuously true of the amylolytic group. It appears that the higher the degree of purification of the amylases, the more nearly do they approach the proteins in composition and properties. Not long ago Fenger and Andrew[2] showed that pepsin of high proteolytic power can be obtained by isoelectric precipitation. At *p*H 2.5, products showing a proteolytic potency of 1 : 65,000 were secured. The analyses of these unique samples by Fenger, Andrew and Ralston[3] of Chicago are characteristic of a protein. All fractions still possess proteolytic properties until they reach the stage when they are sufficiently small to diffuse through parchment or animal membranes. The gradual decrease of proteolytic activity of the enzyme itself is paralleled by loss of its complex protein characteristics. There is no reason at present to modify the belief that the problem of the chemical composition of pepsin is in part at least one of protein structure.

Cod-Liver Oil Emulsion—Y. Funcke and J. H. von Sivers report the results of an extensive series of experiments conducted with the view of elaborating a method of preparing an emulsion of cod-liver oil in which the vitamin content of cod-liver oil is retained in an effective form ("Farmaceutisk Revy," October 13, 1928). As a result of their investigations, based on numerous biological tests, they recommend the following process: Moisten 140 gm. of best gum acacia with ether and reduce to powder. When the ether is dissipated, transfer the powder to a tared flask, wash the mortar with three portions of recently distilled water which are then added to the powdered gum in the flask, and add sufficient recently distilled

[1] Bodansky, M.: Introduction to Physiological Chemistry, John Wiley & Sons, New York, 1927.

[2] Fenger, F., and Andrew, R. H.: On the Isoelectric Precipitation of Pepsin, *J. Biol. Chem.* 73:371 (June) 1927.

[3] Fenger, F.; Andrew, R. H., and Ralston, A. W.: On the Isoelectric Precipitation of Pepsin, II, *J. Biol. Chem.* 80:187 (Nov.) 1928.

water to bring the weight of the contents of the flask to 1,100 gm. Strain the resulting solution through cotton-wool or gauze, and add a mixture of 8 gm. of powdered tragacanth, rubbed down with 8 gm. of alcohol (90 per cent.), and 800 gm. of simple syrup. Heat the mixture on a water bath for 30 minutes, and when cold, transfer it to a tared vessel with a capacity of 12 to 15 litres, adding sufficient recently distilled water to produce 1,888 gm. Now add 1,000 gm. of cod-liver oil, shake occasionally in the course of six hours to form an emulsion, to which 3,800 gm. of cod-liver oil is added in small portions. Then add 152 gm. of the following flavouring essence:

Saccharin	2 gm.
Citric acid	35 gm.
Heliotrope extract	15 gm.
Oil of bitter almond	3 gm.
Oil of peppermint	2 gm.
Alcohol (90 per cent.) to	160 gm.

The product weighs 6,840 gm., and contains 70 per cent. of cod-liver oil. It is used as the base for the preparation of the following compound emulsions:

EMULSION OF COD-LIVER OIL WITH HYPOPHOSPHITES.

Calcium hypophosphite	60 gm.
Citric acid	2 gm.
Recently distilled water	643 gm.

Dissolve, and add:

Sodium hypophosphite	60 gm.

Mix this solution with:

Cod-liver oil emulsion (70 per cent.) (above)	5,140 gm.

Add in small portions:

Solution of sodium hydroxide (17 per cent.)	60 gm.

After standing for ten to twelve hours, with occasional shaking, add a solution of:

Citric acid	17.5 gm.
Recently distilled water	17.5 gm.

The resulting emulsion weighs 6,000 gm., and contains approximately 60 per cent. of cod-liver oil.

EMULSION OF COD-LIVER OIL WITH IRON

Cod-liver oil emulsion (70 per cent.) (above)	1,700 gm.
Calcium hypophosphite	24 gm.
Citric acid	1 gm.
Distilled water	499 gm.
Iron and ammonium citrate	36 gm.
Distilled water	140 gm.

The product weighs 2,400 gm., and contains approximately 50 per cent. of cod-liver oil.—*Chemist and Druggist.*

SEEK TO SIMPLIFY PRODUCTION OF INSULIN—A new and simpler way of making insulin, the great boon to diabetics, may result from studies now being made. Prof. John J. Abel, who was the first to make pure crystalline insulin, reported to members of the American Association for the Advancement of Science today that probably only a part of the complex insulin molecule is responsible for the action of the substance. In that case, it will probably not be necessary to build up the whole complex structure in order to get an active compound.

Prof. Abel and Dr. H. Jensen of the Johns Hopkins School of Medicine are now studying the chemical composition and structure of insulin, which is a substance secreted by the pancreas which acts to regulate the body's utilization of sugar. Lack of insulin results in the disease known as diabetes. Drs. Banting, Macleod, Collip and Best of the University of Toronto were able to prepare a pancreatic extract which contained insulin and was effective in treating diabetes. Prof. Abel and associates later succeeded in synthesizing the crystalline insulin. Insulin is of protein nature.

"The outstanding characteristic of crystalline insulin in comparison with other proteins is its high sulphur content (3.1 to 3.2 per cent.) and its instability toward alkali," said Prof. Abel. Crystalline insulin has a very powerful action. The average daily dosage of insulin given to a patient suffering from diabetes would correspond to 1 mg., or about one-hundredth of a grain, of crystalline insulin.—*Science Service.*

JUGLONE—THE PLANT POISON OF WALNUT TREES—New York, Dec. 27.—Penta-hydroxy-alpha-naphtha-quinone. That is the exact name, outlining for the understanding of organic chemists the exact structure of the stuff in walnut trees that keeps the ground under them bare of plant life. The tracing of this walnut poison to its chemical lair was described recently before the physiological section of the Botanical Society of America by Everett F. Davis of the Virginia Agricultural Experiment Station.

The antagonism of walnut trees to other forms of plant life has long been noted, by farmers as well as botanists. It was supposed that the trees poisoned the other plants, but nothing was really known of the nature of the substance until the Virginia researcher extracted and purified it. Having got the natural substance, he proceeded, after the manner of organic chemists, to make a synthetic duplicate of it. This artificial product proved to be just as poisonous to plants as its natural prototype.

Because the full descriptive chemical name is a bit cumbersome, a shorter one is suggested for common use. The botanical name for the walnut is Juglans, so the newly discovered chemical is called "juglone."—*Science Service.*

MALARIA PREPARATIONS—Few of the preparations on the market labeled as treatment for malaria contain medicament sufficient to constitute adequate treatment for malaria. This is the conclusion of the officials of the Food, Drug and Insecticide Administration of the United States Department of Agriculture who in a survey made during the last year examined more than fifty such preparations.

It is well known that quinine, a cinchona alkaloid, if administered in sufficient quantities and over a sufficient period of time, will destroy the parasite that causes malaria, say the officials. Some of the other cinchona alkaloids also are recognized as having antimalaria virtue if administered in comparable dosage. The United States Pharmacopœia gives fifteen grains daily as the average antimalaria dose of quinine and several of its salts. It is the consensus of present-day medical opinion that this daily dosage continued for a period of eight weeks without interruption will usually suffice to prevent a relapse of the disease.

It is the intention of the Department of Agriculture to take active steps in the immediate future to effect suitable changes in

the formulas of the various preparations on the market labeled for the treatment of malaria which do not contain adequate quantities of the cinchona alkaloids to meet the requirements for the treatment of the disease. Changes in the labeling will also be insisted upon where the claims made are unwarranted by the composition of the preparation. Included in these changes will be the omission of disease names for which the preparation is not a recognized competent treatment.

The Department of Agriculture assumes that in many cases the manufacturer will voluntarily make any necessary changes in their preparations or in their labelings to bring them into harmony with the provisions of the Federal Food and Drugs Act. In those cases in which this is not done appropriate legal action will be taken.

HAHNEMANN VINDICATED?—Were Hahnemann alive in this age, to which he belongs, he would find confirmation in the pathological and therapeutic effects of X-rays and radium—"imponderables"—and by their antagonistically malign and benign actions perfectly exemplifying his law. The chemistry of our day is more and more approaching Hahnemann, with its colloids and ions, its ferments and vitamins. The infinitely little is becoming the infinitely potent, and bulk and energy of particle are seen to be in inverse ratio. For infinite subdivision we may yet come to substitute Hahnemann's "dynamisation" or "potentisation." Chemistry has now its colloidal gold, silver, etc., and while homœopathy warns us to be cautious with potentised silica for its power of breaking down scar tissue, and liberating tubercle, non-homœopaths have demonstrated the power of silica to produce fibrosis of liver, kidneys, etc. Thus is Hahnemann every day finding confirmation.—J. Weir (*The Practitioner,* 724, 213, 1928, through *Pharm. Jour.*)

SESQUIPEDALIA—Journalists and the public who know no better make great play with the elongations of chemical nomenclature. A paragraphist in the London *Morning Post,* who has been indulging in this game, has provoked the following "retort courteous" from "Jacob Faithful," the pseudonym of a professor of chemistry, who asks: "Why not range yourself on solid ground beside the name of Emil Fischer's octadecapeptide? This compound, which 'represents a short step only in the direction of protein synthesis,' has the for-

mula $C_{48}H_{80}O_{19}N_{18}$. As the name will indicate, when we get to it presently, its molecule is built up from three leucine and fifteen glycine molecules. Organic chemists (who prefer to talk about it in June rather than in December) call it—

laevoleucyltriglycyllaevoleucyltriglycyllaevoleucyloctaglycylglycine.

"I may add that in all probability the protein of egg-white has a molecule about ten times as large (and a name ten times as long) as the above."—*Pharm. Jour.*

Shades of the polysyllabic Cymric. To think that the sulphurous protein of a gallinaceous egg should deign to out-syllable that famous Welsh nomenclatural atrocity—the name of the little ecclesiastical hamlet out Anglesey way: "Leanfairpwllgwyngyllgogerychuryrndrobwllllandysiliogogogoch." Yet we offer to the Druidic remnants the consolation that only a Welsh chemist can pronounce the latter name while any old chemist can reel off the leucine-glycine molecules.

Denicotinized Tobacco—Several processes may be used in the preparation of denicotinized tobacco. Nicotine may be removed by the use of suitable solvents; or the tobacco may be subjected to a resweating either by treatment with superheated steam or by heating in a vacuum chamber. E. M. Bailey, O. L. Nolan, and W. T. Mathis (*Conn. Agric. Exp. Station Bull.* 295, 338-351, 1928) have analyzed seventeen samples of denicotinized tobacco as found on the market in cigars, cigarettes, and smoking tobacco. For comparison they also analyzed eighteen samples of ordinary tobacco as found on the market, and collected from the literature forty additional analyses of ordinary tobacco as found in cigars, cigarettes, and smoking and chewing tobacco. The total nicotine content, calculated on the moisture-free basis, ranged between 0.47 and 3.63 with an average of 1.96 per cent. in the fifty-eight analyses of ordinary tobacco, and between 0.74 and 2.73 with an average of 1.41 per cent. in the seventeen analyses of denicotinized tobacco. When tobaccos of corresponding leaf types were compared, the denicotinized products, as a rule, contained but little less nicotine than the ordinary products. While considerable reductions in nicotine content were indicated in certain instances yet it was not difficult to find brands of ordinary

tobacco with a nicotine content not greatly in excess of that present in the most thoroughly processed of the denicotinized products. Nicotine is an important, if not the chief, factor in the production of the satisfying effects derived from smoking. Use of denicotinized products may lead to increased indulgence; and the actual nicotine intake may equal or exceed that when ordinary tobacco is used. None of the denicotinized tobaccos analyzed were sufficiently low in nicotine content to warrant unrestricted indulgence by persons who suffer ill effects from this alkaloid.

Free nicotine occurs in tobacco, and is due, apparently, to the dissociation of the nicotine salts of organic acids. The harsh and irritating effects on smoking may be due to free nicotine. Denicotinized tobacco did not differ markedly from ordinary tobacco with respect to the free nicotine content. The distribution of the nitrogen as nitrate nitrogen and as ammoniacal nitrogen was practically identical in the two classes of tobacco.—J. S. H. from *Jour. Frank. Inst.*

NEWS ITEMS AND PERSONAL NOTES

American Pharmaceutical Association Officers-Elect—The Board of Canvassers of the American Pharmaceutical Association composed of Oscar Hallenberg, Glen M. Cook and H. O. Tiegen, all of Bismarck, North Dakota, has announced as the result of the mail ballot for officers of the association, the election of the following:

President, H. A. B. Dunning, Baltimore, Md.

First Vice-President, A. L. I. Winne, Richmond, Va.

Second Vice-President, W. B. Goodyear, Harrisburg, Pa.

Members of the Council (for three years), J. H. Beal, Camp Walton, Fla.; C. E. Caspari, St. Louis, Mo.; C. H. LaWall, Philadelphia, Pa.

Member of the Council (for one year, to fill the unexpired term of the late George M. Beringer), W. Bruce Philip, San Francisco, Cal.

These officers will be installed at the next annual meeting of the association in Rapid City, S. Dak., August 26-31, 1929.

PROFESSOR ARNY EXCHANGE LECTURER—Students at the Philadelphia College of Pharmacy and Science, numbering over six hundred, officers of the institution and numerous guests listened with great satisfaction to a lecture on pharmaceutical research, by Dr. Arny of the New York College of Pharmacy, on Tuesday, January 22. The series of exchange lectures, delivered at the New York and Philadelphia Colleges have proven a great success. Dr. Arny's splendid contribution earning for him a secure place in the regard of an appreciative student audience in Philadelphia.

After the lecture Drs. Arny and Lascoff and members of the faculty of the Philadelphia College were entertained at luncheon by President Krusen of the college.

A NOVEL CATALOGUE—A recent mail brought to us a pharmaceutical catalogue which to say the least is striking and unusual.

It is the new 1929 list of the Mulford Laboratories and is a radical departure from the usual run of price lists.

It employs the modernistic style throughout and taking advantage of photography to reproduce unusual effects, a series of colored inserts has been prepared and used to mark the various divisions of the Mulford line.

The color scheme is in orange, black and red, making for a startling yet pleasing result.

Copies may be had by addressing H. K. Mulford Company, Philadelphia, Pa.

BRITISH & COLONIAL PHARMACIST EXHIBITION—The thirty-fifth Chemists' Exhibition, organised by the "British & Colonial Pharmacist" will be held in the new Hall of the Royal Horticultural Society, situated in the center of the West End of London, an advantage which cannot be overestimated, particularly where visitors from overseas are concerned. The dates are May 27th-31st. All members of the drug and chemical trades who are in England during the week will receive a cordial welcome on presentation of their professional or business cards.

BOOK REVIEWS

THE ROMANCE OF PERFUME, by Richard Le Gallienne, illustrated by George Barbier. Published by Richard Hudnut, New York and Paris. Printed on special antique rag-paper and done at the Printing House of William Edwin Rudge, January, 1928.

"Dainty" is the first word that comes to the reviewer's mind as he essays to jot down his impressions of the violet-tinctured little volume written in praise of perfume.

Everything that composes this bit of prose distilled to poesy is sheer and dainty. There is the curving style of Le Gallienne—the lubricated lilt of his free-flowing pen—and his inimitable way of framing phrases that are in themselves a scent and a savor.

And the illustrations by George Barbier—in equally dainty style —as *belonging* to the book as any of its pertest paragraphs.

The layout—the type (an English adaptation of French 16th Century type)—the binding—the ensemble—all breathe perfume—and romance—the kind of romance that is more romantic because of its truth.

Reading it, the mind freely cavorts over the trail of centuries, is spiced and balsamed at Egyptian courts, samples the scents in heavenward unguents and altar-odors of Hebrew holy performances —senses the exotic lotus-laden exhalations of mummied queens—long since resolved to memories—yet breathing living perfumes.

The parade of the scented dead goes by—Sheba and Cleopatra —the sturdy Tamerlane, terror and tender, too; good queen Bess with lavendered ruff; and Pompadour, Dubarry and Diana of Poitiers—all lillied and gilly-flowered—and as Le Gallienne writes:

"The mind insensibly forgets its cares, and the soul dreams"—

> 'As when a box of essences
> Is broken on the air'"

The reviewer does not know just how this little volume may be secured but he unhesitatingly recommends it to the attention of those who are fond of "dainty" reading.

IVOR GRIFFITH.

BACTERIOLOGY AND SANITARY SCIENCE, by Louis Gershenfeld, B. Sc., Ph. M., Professor of Bacteriology and Hygiene in the Philadelphia College of Pharmacy and Science, Philadelphia. Published by Lea & Febiger, Washington Square, Philadelphia. 432 pp., 30 illus., 2 plates. Cloth, $4.00.

The position of Professor Gershenfeld as a lecturer in the Sanitary Sciences is already well established and this book, which is the outgrowth of his lecturing and practical laboratory experience, is equally certain of finding a wide field of service. The subjects with which it deals are handled in as elementary a manner as is possible, and the arrangement should fit into every general scientific course. The pharmacist, the chemist, the nurse, *et al.*, are expected in these modern days to have a working knowledge of health education and health care. It is not only their privilege, but their duty to coöperate with all health agencies in the dissemination of reliable data concerning public health. The several branches of science considered in this volume are closely intertwined. Hygiene, sanitary law and sanitation are practically governed by the teachings and findings in bacteriology and parasitology.

The scope and arrangement of the subjects treated in this book are the result of many years of experience in the teaching of these subjects to students in the several allied sciences, and contact with these students when as graduates. They, in the practice of their respective professions, make inquiries concerning the topics listed in this volume. The fundamental principles, techniques and methods of laboratory work are treated as fully as seems desirable for the amount of laboratory instruction generally given to such students and as would be required by them.

The classification of bacteria and the nomenclature advocated by the Bergey Committee of the Society of American Bacteriologists has been adopted in the book and a special chapter is set aside for a synopsis of the findings of that Committee.

As a book of reference—as a text-book in its field—as a mine of scientific information, the reviewer heartily recommends this work as a valuable addition to the technical library.

IVOR GRIFFITH.